METAL INDUSTRY

WITH WHICH ARE INCORPORATED

ALUMINUM WORLD ▲ COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

Volume 32, Number 8 AUGUST, 1934 Two Dollars Per Year

METAL INDUSTRY is Published monthly by The Metal Industry Publishing Company, 116 John Street, New York, N. Y., U. S. A.
Entered as second class matter February 10, 1903, at the Post Office in New York under the Act of March 3, 1879.
Volume 32, Number 8, August, 1934. Two Dollars Per Year.

METAL INDUSTRY

With Which Are Incorporated
COPPER AND BRASS
BRASS FOUNDER AND FINISHER
ALUMINUM WORLD
ELECTRO-PLATERS' REVIEW

Address all correspondence to Metal Industry, 116 John St., New York. Telephone, BEekman 3—0404. Cable Address Metalustry.

PALMER H. LANGDON..Editor and Publisher
ADOLPH BREGMAN.....Managing Editor
THOMAS A. TRUMBOUR..Business Manager
EVAN J. ROBINSON....Advertising Manager

Member of Audit Bureau of Circulations and The Associated Business Papers

Published Monthly—Copyright 1934 by The Metal Industry Publishing Company, Incorporated; Entered February 10, 1903, at New York, N. Y., as second class matter under Act of Congress, March 3, 1879.

SUBSCRIPTION PRICES: United States, $2.00 Per Year; Canada and Foreign $2.50. SINGLE COPIES, 20 CENTS. Please remit by check or money order; Cash should be registered. Advertising Rates on Application. Forms Close the First of the Month.

Vol. 32 AUGUST, 1934 No. 8

TABLE OF CONTENTS

METAL INDUSTRY articles are listed regularly in the "Engineering Index" and "Industrial Arts Index"

Buyers' Guide, Advertising Page 35

METAL INDUSTRY

WITH WHICH ARE INCORPORATED

ALUMINUM WORLD ▲ COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

Vol. 32 NEW YORK, AUGUST, 1934 No. 8

The Effect of Some Mill Variables on the Gauge of Sheet Brass

C. K. SKINNER

General Electric Company, Bridgeport, Conn.

In General the Variables Encountered in Mill Pactice Which Greatly Influenced the Gauge of the Sheet Metal Were: 1. The Roller's Ability; 2. The Heat of the Rolls; 3. The Width of the Metal; 4. The Reduction Per Pass; 5. The Temper of the Metal. Those Which Had Little Bearing Were: 1. The Speed of Rolling (Within Stated Range); 2. Variations in Cast or Overhauled Bar; 3. Oxidation from Anneal.

THE object of this paper is to set forth the influences that the mill variables as above mentioned have on the gauge of sheet brass as rolled on the ordinary two-high mill.

In order to accomplish this a brief history of the rolling process might be of interest. The roll for the reduction of sheet metal today is directly descended from the wheel as used on early carts and wagons. The wheel first appeared on burden bearing carts and chariots about 3000 B. C. These were naturally crude, and it was not until several thousand years later that the first reduction of metal to a uniform gauge was attempted by Brulier in France. This attempt was made in 1550 and the metal so rolled was used in making coins. Swedenborg pictured in 1734 a water-power driven stand for rolling copper sheets. About this time rolling in Wales began to develop to a comparatively high degree.

The first rolling of brass in America was done at Waterbury in the early Nineteenth Century by the Grilley's and the Porter Brothers, Abel and Levi. Since that time mechanical rolling progress has been rapid with the development of the tandem, four-high, and cluster mills, roller bearings and improved methods of lubrication, as well as power drive development; but slow in eliminating the human factor.

Types of Mills

In general there are three main types of mills in use today: the two-high, the four-high, and cluster. Figure 1 indicates in diagram form, the main differences. Of these, the two-high is most commonly used. The rolls are made either from cast iron or steel and run at various speeds. Both rolls of this type are driven, and are placed directly over one another in the housing supported at the necks by the conventional "brasses". The range of dimensions of the rolls considered in this paper is from 12" x 16" to 20" x 44".

The four-high mills consist of two working rolls, the middle two, backed up by two larger rolls. The working rolls vary in diameter with the class of work. For steel, 3" working rolls and 12" backing rolls are often used. The working rolls are driven, the backing rolls turn by friction from contact with the working rolls. The working rolls bear in brass, the backing rolls are equipped with roller bearings. Working rolls of hardened steel and backing rolls of cast iron are the common practice in this type of mill.

In the cluster mill the roll compositions are the same as in the case of the four-high. In these mills the working rolls are backed by two rolls instead of

one, and like the four-high, the working rolls bear in brass, the backing in roller bearings. Also the working rolls are driven and the backing rolls turn by friction. In a mill of this variety, made by a well known maker, the conventional pinion drive has been discarded, and the bottom roll is driven on one side, the top roll on the other. A mechanism is so arranged as to drive both rolls at the same speed. Each backing roll may be independently raised or lowered and a powerful screw down drive is provided so that the rolls may be adjusted even during the active pass.

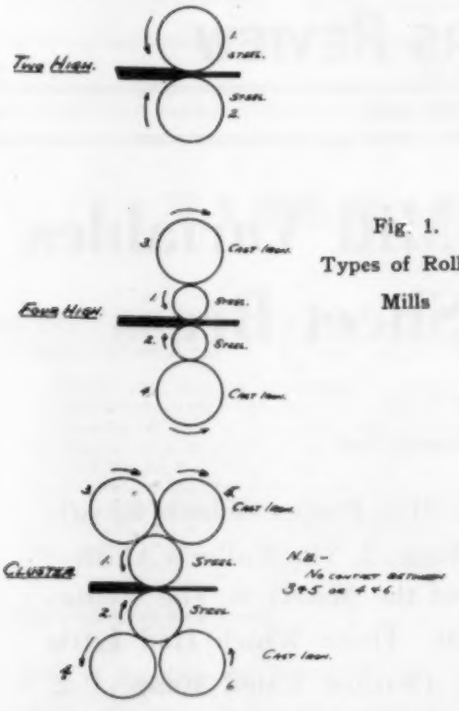


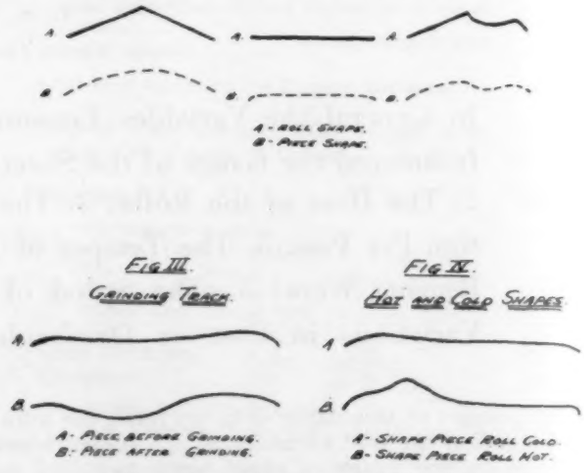
Fig. 1. Types of Rolling Mills

A brief summary of the advantages and disadvantages of these three types follows:

Type	Advantages	Disadvantages
2 High	Simple design	Easily deflected Easily heated Must be ground often Hard to grind Difficult to change High cost per hour of life Limited reduction per pass No standard shape
4 High	Extreme rigidity Standard shape Low working roll cost Ease of roll removal Greater reductions per pass More accurate rolling Elimination of heat swelling Less floor space	Greater first cost More complicated machine Working rolls hard to keep in alignment with backing rolls
Cluster	Greatest reductions per pass Less power consumed Low roll cost Fewer grindings Minimum roll deflection Good alignment at all times No spalling at great pressures Bearings for working rolls unnecessary	High cost Complicated Large floor space

Discussion of Roll Shapes

The shape of a pair of rolls is of paramount importance where the flatness and straightness of product are concerned. The influence of the roll shape on gauge is further discussed later in this paper. The shape, or contour, of a pair of rolls is easily and accurately determined outside the housing by means of micrometer calipers, but when the rolls are on duty in the stand, the use of calipers is impossible. The roller has long used a method whereby the contour is determined to his satisfaction. This consists of putting the rolls as tightly together as the screws permit. Then a piece of metal the width of the rolls and about eight inches across is put through so that the total face of the rolls does work on the sheet. In passage the high points of the rolls elongate the sheet more than the low points. The last edge of the sheet out indicates the contour of the team of rolls. Thus in Fig. 2 the outline of various rolls, exaggerated, and their resultant test pieces are shown. It can be



Figs. 2, 3 and 4. Different Roll Shapes

readily appreciated that in order intelligently to tell anything definite of the shape of rolls by this method, a standard procedure of taking the piece is a necessity.

In two-high mills (and this discussion concerns only such) the cast iron rolls are usually ordered with a .005" crown, the steel rolls flat. In constant usage the rolls wear rapidly, especially when lot after lot is rolled on the same increment of face. Grinding must then be resorted to to bring the rolls back into shape. Fig. 3 shows the test pieces before and after grinding. When rolls come up to their normal working temperatures their shape is quite different from that as indicated cold. Fig. 4 shows this difference in the shape pieces taken cold and after in use for about three hours.

It is generally accepted that few rollers know the exact relationship between the size contour of the rolls and the shape contour of the test piece. This is best explained by the fact that a standard for taking test pieces is not in vogue. A series of tests were conducted to ascertain this relationship. Using a test piece of .020" high brass of a known anneal, it

was found that for every .001" variation from the flat of the roll there was a .015" variation in the shape of the test piece. Rolls were thus found that would swell as much as .004" when working. This should indicate the acceptance in brass mills of the steel mill practice of shaping rolls at their working temperatures.

The reason why iron rolls when new are ground with a .005" crown and steel rolls flat is not clear. Obviously there should be a standard shape depending upon the material of the rolls. For the same class of work, steel and iron rolls cannot be of the same shape because of their different coefficients of expansion and bending moments.

The old Welsh rollers decreed that the rolls should be flat, or truly cylindrical, when the metal is passing through. A prominent steel rolling (hot) firm has disproved this theory by exhaustive tests. These show that the uniformity of gauge is best obtained by reducing the convexity of the cross section of the piece being rolled with each pass. The rolls are ground to various degrees of concavity.

There is no doubt that the brass mill could work out and adopt this seemingly well-proved principle for brass if it used, as this steel mill does, a constant width, temper, temperature, thickness, and composition sheet on a train of rolls ground to various concavities. But for widely variant types of work and sizes of rolls, this would be foolish to attempt.

To obtain flat work with a one number hard temper, a different shaped roll is needed than for work of eight number temper. For this reason a track, or concave place, is kept in some rolls to one side to enable the rolling of one number work without the grinding operation. The difference in shapes required seems to be largely due to the shape on which the metal has its get ready rolling. When 1 number metal is gotten ready in a track, it is harder to roll it flat on the finish pass in the track.

The shape of rolls doing active duty is influenced by the stream of cooling water played on the roll at the discretion of the roller. This is never constant but is varied to meet the conditions and the worn shape of the rolls.

This article will be continued in an early issue. —Ed.

A Study of Cast Red Brass

ONE of the researches undertaken at the National Bureau of Standards in cooperation with industry was a study of red brass of the nominal composition 85 copper, 5 zinc, 5 tin, 5 lead. The conclusions arrived at are given briefly below.

The tensile strength, electrical resistivity, hardness and density of cast red brass (copper 85, tin 5, zinc 5, lead 5) were determined on four types of test bars—two sand-cast, a chill ingot and a special bar dipped from the molten metal. The pouring temperature was varied from 1040 to 1260 degrees Cent. Data on the shrinkage and running properties were also obtained. The most important results follow:

1. Properties of test bars made of virgin or of remelted metal of the same nominal composition, cast at the same temperature, were alike.

2. Pouring temperature affected the properties of all the test bars much more than any other factor. In general, the best results for the sand-cast bars were obtained with a pouring temperature below 1205 degrees Cent.

3. These effects of pouring temperature on the physical properties of test bars were the same for alloys containing either sulphur (maximum 0.10 per cent) or iron (maximum 0.6 per cent).

4. Physical properties of test bars poured at 1150 degrees Cent. or below were not affected appreciably by the presence of sulphur up to 0.10 per cent. In bars poured at higher temperatures 0.10 per cent of sulphur adversely affected the properties, particularly of the sand-cast bars. Additions of iron up to 0.6 per cent had similar but much less pronounced effects.

5. Detrimental effects of high pouring temperatures and of impurities were much more pronounced in the sand-cast bars than in the other types. The non-uniform grain structure of the sand-cast bars and the existence in them of a strained condition during cooling probably are related to these effects.

6. Flowing properties increased with the pouring temperature. The presence of sulphur, up to 0.10 per cent improved the flowing properties, while iron had no consistent influence. Similar statements apply to the shrinkage.

7. A comparison of the results of tensile strength and hardness with the minimum requirements for this alloy in ingot form set forth by the American Society for Testing Materials shows (a) that the end-gate sand-cast bar is unsuitable for low pouring temperatures, (b) that, with this exception, all sand-cast bars of virgin or remelted metal poured at a temperature not exceeding 1205 degrees Cent. easily meet these minimum requirements and (c) the presence of sulphur up to 0.10 per cent, or of iron up to 0.6 per cent is not objectionable in sand-cast bars. The adverse effect of pouring temperatures above 1205 degrees Cent. was not so pronounced in the chill-ingot and other bars as in the sand-cast bars.

8. The relatively wide variation in the physical properties of different types of test bars obtained from the same heat of metal forcibly emphasizes the need for a standard method for obtaining the test bars. In many respects the sand-cast bars were not so suitable as those obtained by other methods.

The complete paper describing this work was presented as the Annual Exchange Paper of the American Foundrymen's Association, at the recent meeting of the Institute of British Foundrymen, by C. M. Saeger, Jr., physicist of the National Bureau of Standards in Washington, D. C.

Progress in Standards for Metals

Fifteen Non-Ferrous Projects Are Reviewed in Report

The following review of all the projects on non-ferrous metallurgy under the procedure of the American Standards Association presents an up-to-date summary of the status of these projects. The information was taken from the files of the American Standards Association and is correct to March 1, 1934.

H1—Zinc and Zinc Ores, Sponsor—American Society for Testing Materials.

The development of standards under the scope of this project has been deferred until industrial requirements become more definite.

H4-1928—Specifications for Soft or Annealed Copper Wire.

H14-1929—Specifications for Hard-Drawn Copper Wire.

H15—Specifications for Medium Hard-Drawn Copper Wire.

H16-1928—Specifications for Tinned Soft or Annealed Copper Wire for Rubber Insulation. Sponsor—American Society for Testing Materials.

The four projects listed above are under the supervision of a single sectional committee, which is identical in personnel with A.S.T.M. Committee B-1 on Copper Wire. Standards for three of these projects were approved in 1928 and 1929 as follows: H4-1928 (A.S.T.M. B 3-27), H14-1929 (A.S.T.M. B 1-27) and H16-1928 (A.S.T.M. B 33-21). A.S.T.M. Specifications for Medium Hard-Drawn Copper Wire (A.S.T.M. B 2-27) are under consideration by the sectional committee as project H15. Specifications for Tinned Soft or Annealed Copper Wire for Rubber Insulation—H16-1928 (A.S.T.M. B 33-21 and Specifications for Soft or Annealed Copper Wire—H4-1928 (A.S.T.M. B 3-27) have been used as the basic wire standards by the sectional committee for project C8 and have also been published as C8b1-1928 and C8b2-1928, respectively.

H7-1925—Specifications for Brass Forging Rod. Sponsor—American Society for Testing Materials.

No revisions are under way on this standard (A.S.T.M. B 15-18) which was approved as American Tentative Standard in 1925.

H8—Specifications for Free-Cutting Brass Rods for Use in Screw Machines. Sponsor—American Society for Testing Materials.

Action on A.S.T.M. B 16-29, submitted by the Society as a revision of an earlier document and approved by ASA in 1925, has been deferred pending the receipt of further information from the A.S.T.M.

H11-1924—Specifications for Solder Metal. Sponsor—American Society for Testing Materials.

Submitted as an existing standard and approved by ASA in 1924 as an American Tentative Standard, these specifications (A.S.T.M. B 32-21) have been unchanged since their adoption.

H13-1925—Outside Dimensions of Plumbago Crucibles for Non-Tilting Furnaces in Non-Ferrous Foundry Practice. Sponsors—American Foundrymen's Association; Plumbago Crucible Association.

No revisions have been made in this standard, which was developed by the Plumbago Crucible Association and approved as American Tentative Standard in 1925.

H17—Specifications for Ingot Copper.

Two A.S.T.M. standards, submitted in 1929 under the proprietary sponsorship method, were approved in 1932. The titles and designations are as follows:

H17.1-1932—Specifications for Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars (A.S.T.M. B 4-27).

H17.2-1932—Specifications for Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars (A.S.T.M. B 5-27).

H19—Specifications for Sheet High Brass.

Pending consideration by the A.S.T.M. of certain revisions proposed in 1932 by A.S.T.M. B-5 on Copper and Copper Alloys, action by the ASA has been withheld.

H20—Specifications for Manganese Bronze Sand Castings.

H21—Specifications for Manganese Bronze Ingots for Sand Castings.

At the request of the A.S.T.M. the ASA has withheld consideration of these two specifications (A.S.T.M. B 54-27 and B 7-27) until action with regards to possible changes in certain sections of this document, now under consideration in A.S.T.M. Committee B-5 on Copper and Copper Alloys, has been completed.

G8—Specifications for Zinc Coating of Iron and Steel. Sponsor—American Society for Testing Materials.

G8a—Technical Committee I—Hardware and Fastenings. During the past year Specifications for Zinc Coating (Hot-Dip) on Hardware and Fastenings was published by the sponsor as a tentative standard, following recommendations from the sectional committee.

G8g—Technical Committee VII—Methods of Testing. This group, which also functions as Sub-committee VII of A.S.T.M. Committee A-5 on Corrosion of Iron and Steel, is engaged upon a study of data obtained from further experiments on the subject of industrial atmosphere tests. A report covering further research into the effectiveness of the Preece test is in preparation. In 1933 the Society adopted a revision of its Standard Methods of Determining Weight of Coating on Zinc Coated Articles—A.S.T.M. A90-33.

Welding of Commercial Yellow Brass Pipe

Data and Tests of 4-In. Standard Iron Pipe Size 70-30 Brass Pipe*

INCREASING interest in the welding of the larger sizes of commercial yellow brass pipe has prompted an investigation to study further the question of the best type of joint design, and to obtain more accurate cost data. Because previously existing data and tests were confined largely to the 1 and 2 in. sizes, it was decided to make these tests on 4 in. pipe.

As a result of this investigation, it may be stated that the welding of commercial brass pipe offers no difficulty or unusual problems. In fact, the average experienced operator can weld brass pipe as easily as steel in all positions. The plain butt type joint with ends beveled approximately 45 deg. was found to be the best joint design, from the standpoints of both economy in welding and joint strength. This type of joint is recommended for brass pipe where the wall thickness exceeds ⅛ in. For thinner wall pipe, the short bell-and-spigot type joint may be used.

Material

The pipe used for the tests was commercial yellow brass having approximately the composition of 67 per cent copper and 33 per cent zinc, with small traces of lead. This is known metallurgically as alpha brass. The outside diameter was 4½ in. and the wall thickness ¼ in., these being the same dimensions as 4-in. standard steel pipe.

Joint Design

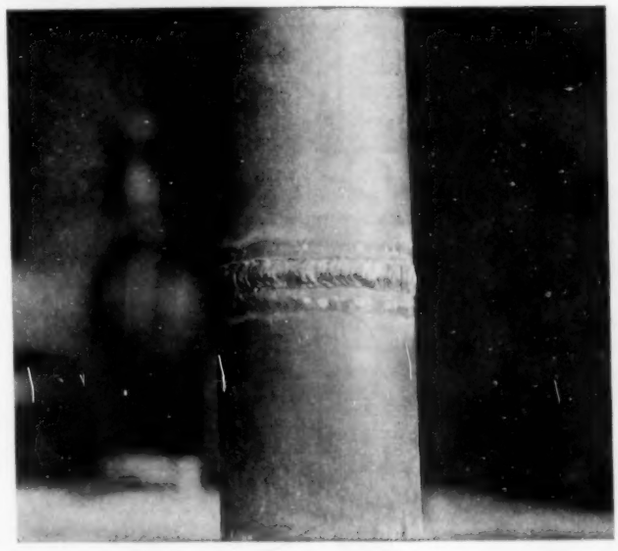
The joint design used was of the open single vee butt type with the ends beveled to 45 deg. and with a 1/16 in. unbeveled shoulder at the inside wall. The short bell-and-spigot joint is discussed later in this article.

Welding Technique

The welding of brass pipe calls for nothing unusual in pipe welding technique and can be easily done by any operator competent to weld steel pipe. Welding of yellow brass pipe of this composition, in which the melting point of the base metal so closely approximates the melting point of the bronze welding rod, is really a cross between fusion welding and bronze-welding. The essential factor is to melt the wall of the vee just sufficiently to insure positive sweating of the base metal in advance of the puddle. As in all bronze-welding, a suitable flux should be used.

Rotation welds offer no difficulty whatsoever, requiring only a little longer time to start welding because of the higher heat conductivity of brass as compared to steel. Puddling and manipulation of rod and flame are the same as in steel welding with forehand technique. Overhead welding likewise is easy and not at all complicated. The welding, as for steel pipe, merely requires the proper manipulation of rod and flame in controlling the puddle.

Welding brass pipe in a fixed vertical position is less easily accomplished, as is true with steel pipe, but



Typical butt type weld in 4 in. diameter brass pipe. White spots on pipe are flux

here likewise any operator competent to weld steel pipe in this position can control and deposit the bronze weld metal with ease. It was formerly supposed that the bell type of joint would facilitate welding of vertical pipe such as risers because of the shelf supplied by the bell, but actual investigation proves that the butt type joint can be as readily welded as the bell type in the larger diameters where the wall thickness is ⅛ in. and greater. A suitable technique is to de-

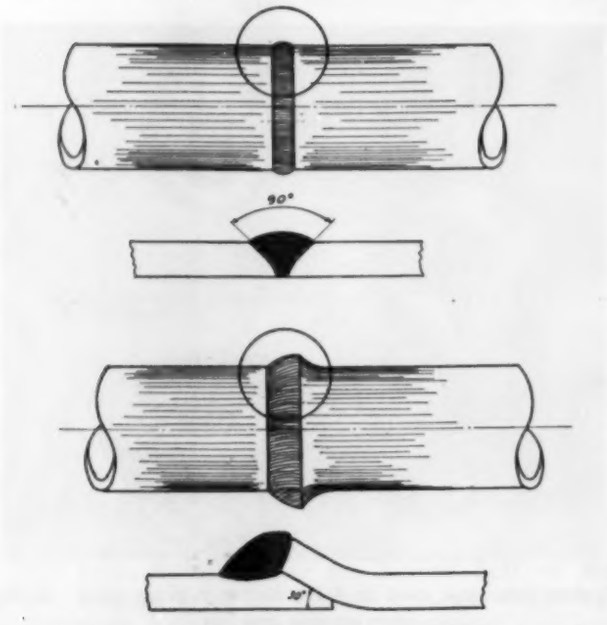
Note characteristic technique of sloping puddle, maintenance of molten metal by flame pressure and protection of upper pipe edge with rod

*From Oxy-Acetylene Tips November 1933.

posit the metal in a sloping puddle, directing the flame upward so as to retail the molten metal, at the same time manipulating the rod in the puddle to prevent excessive melting of the upper half of the joint and to solidify the puddle in even ripples. This again is similar to ordinary steel pipe welding technique.

Throughout the investigation Oxweld No. 25 M. Bronze Rod was used.

As this brass contains a small amount of lead, there



Above—Open single vee butt type joint for commercial yellow brass pipe. Below—Design of typical bell-and-spigot joint for brass pipe of less than ⅛ in. wall thickness

is a tendency for the base metal to honeycomb slightly at the edge of the weld, but this is only a surface factor and is unimportant.

The welding should be done with a slightly oxidizing flame, since a drift of the flame to a reducing adjustment (excess acetylene) would cause excessive boiling.

Test Data

Test data showing rod, oxygen and time required in welding 4-in. brass pipe joints in various positions are shown in Table I. The time for welding with the pipe in a fixed vertical position, or in a fixed horizontal position requiring overhead welding on the bottom, is influenced far more by the skill of the operator than by the question of the weldability of the brass base material.

TABLE I. TEST DATA—4-IN. STD. I.P.S. BRASS PIPE

Open Single Vee Butt Type Weld—90-Deg. Vee

Weld No.	Type of Weld	Welding Rod*, Lb.	Oxygen*, Cu. Ft.	Welding Time*, Min.
A	Rotation	0.39	4	9½
B	Rotation	0.44	3	8
C	Rotation	0.43	4	12
	Average	0.42	4	10
D	Vertical Position	0.39	3	8½
E	Horizontal Position	0.44	3	12

*All data given are for actual welding of the joint only and do not include tack-welding. All joints were tack-welded at three points with a spacing of approximately ¼ in. before tack-welding. Rod used was Oxweld No. 25M. Bronzed, 3/16 in. diameter. Tip aperture size was equivalent to a No. 45 drill size on a low pressure injector type blowpipe.

In Table II is given a comparison between the time and materials required for welding steel and brass pipe. A conservative estimate may be made on the basis that the welding time and oxygen required for welding brass pipe are about 15 per cent less than for steel where forehand technique is employed, the rod consumption being practically the same. To estimate quantities for welding overhead joints, or joints in vertical pipe, the figures in Table II should be multiplied by the factor 1.4 as given in "Fabrication of Oxwelded Piping" (published by The Linde Air Products Company). The test data given in Table I do not show much difference between rotation and position welding but this was due to the work being done in the most convenient position, a condition rarely found on the job.

TABLE II. WELDING RATES AND MATERIAL CONSUMPTION FOR STEEL AND BRASS PIPE

Forehand Technique—Rotation Welding—90-Deg. Vee Brass Pipe Equivalent in Wall Thickness to Steel Pipe

Nominal Size of Pipe, In.	Pipe Wall Thickness, In.	STEEL PIPE* Welding Time, Min.	Oxygen, Cu. Ft.	Welding Rod, Lb.	BRASS PIPE Welding Time, Min.	Oxygen, Cu. Ft.	Welding Rod Lb.
2	5/32	6	2	0.2	5	2	0.2
2½	7/32	8	3	0.25	7	3	0.25
3	9/32	10	4	0.3	8.5	4	0.3
3½	5/32	11	5	0.35	9.5	4.5	0.35
4	¼	13	6	0.4	11	5.5	0.4
5	¼	16	8	0.55	13.5	7	0.55
6	5/32	21	12	0.8	18	10.5	0.8
8	7/32	29	20	1.1	25	17	1.1
10	7/32	37	33	1.7	32	28	1.7

*Welding data given in "Fabrication of Oxwelded Piping."

Test Results

The tensile tests of coupons cut from the butt joints made in various positions are given in Table III. It will be noted that the strength of the annealed brass pipe, approximately 32,000 to 42,000 lb. per sq. in., was obtained in all the tests.

TABLE III. TENSILE TEST RESULTS

Coupons Cut from Butt Type Joints in 4-in. Std. I. P. S. Brass Pipe

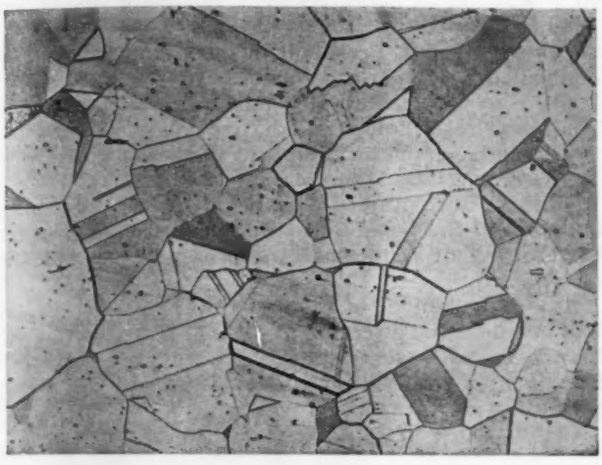
Weld No.	Type of Weld	Welding Time, Min.	Tensile Strength of Coupons, Lbs. per Sq. In.	Fracture*
A	Rotation	9½	38,200	Weld and pipe
			35,100	Weld and pipe along scarf
B	Rotation	8	35,800	Weld and pipe near scarf
			34,100	Weld and pipe near scarf
C	Rotation	12	42,000	Base metal ¾ in. from weld
D	Vertical Position	8½	35,400	Base metal and scarf
			39,300	Base Metal
			32,500	Base metal near scarf
			39.000	Base metal
			34,000	Base metal near scarf
E	Horizontal Position	12	37,600	Base metal near scarf
			32,000	Along scarf, small lap
			32,100	Base metal near scarf
			33,600	Base metal near scarf
			35,300	Base metal near scarf

*Most of the specimens failed in the base metal near the scarf, but this is believed to be due to stress influence set up at this point by the stronger and harder weld metal when the softer base metal started necking down at the point of failure.

Bell-and-Spigot Joint

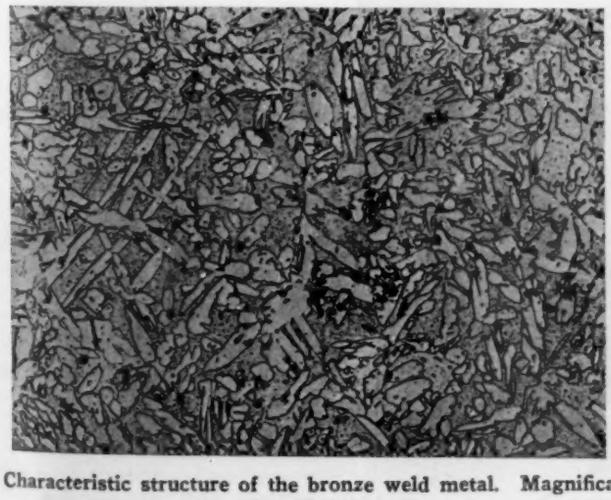
Previously published data in oxy-acetylene tips and other literature advocated the short bell-and-spigot joint (shown in an accompanying diagram) for oxwelding brass pipe. This was because tests made in the past on smaller diameter pipe seemed to indicate that this type of joint gave more satisfactory welding conditions.

In this investigation, short bell-and-spigot joints



The structure of commercial brass pipe, 70 per cent copper—30 per cent zinc. Magnification X 100

were welded in fixed horizontal and vertical positions, under the same conditions and using sections of the same 4 in. pipe as for the butt type weld tests. Not only was extra time consumed in preparing the bell and beveling the spigot end, but approximately 50 per cent more time and gases were required in welding the joints. Comparative tensile tests were not possible because of the eccentricity of the bell-and-spigot joint, but such tensile tests as were made



Characteristic structure of the bronze weld metal. Magnification X 100

showed that the butt type welds were the stronger by a good margin.

Since joint preparation and welding costs for short bell-and-spigot joints are not excessive for the smaller diameters, and because line-up and tack-welding are simpler, this type of joint may be found equally as satisfactory as the butt type for pipe sizes where the wall thickness is ⅛ in. or less. Previous tests, as stated before, have shown that weld strengths in the smaller diameters are quite satisfactory.

Structure of Joint

Three photomicrographs are shown on this page in order that the crystalline structure of the oxwelded brass joint may be studied.

To the left is shown the structure of the 70 per cent copper—30 per cent zinc commercial yellow brass pipe at a distance 2 in. from the weld. The structure is composed entirely of alpha brass crystals in the annealed condition.

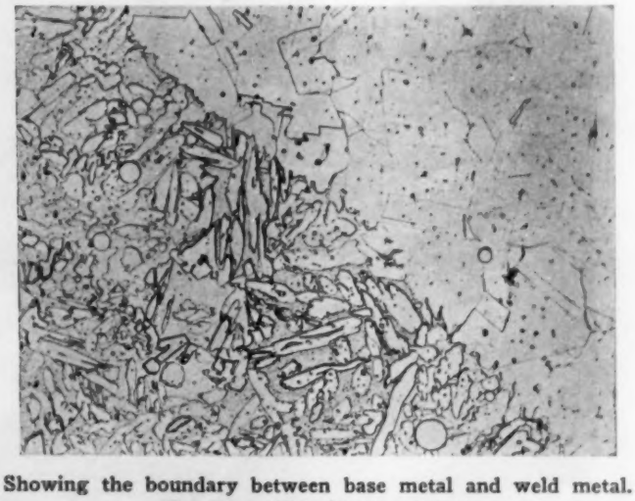
The photomicrograph below shows the boundary between the alpha brass pipe and the bronze weld metal. As in the first photomicrograph, the base metal in the upper right-hand corner consists of one type of crystals (alpha brass), whereas the weld metal in the lower left-hand corner is composed of three constituents, alpha and beta crystals, and the delta or hard constituent. The higher strength of the bronze weld metal is due to a large extent to the presence of the beta constituent.

In the last photomicrograph is shown the structure of the bronze weld metal. It contains alpha, beta, and delta constituents, and the absence of porosity is clearly evident.

Conclusions

1. Although the full strength of the short bell-and-spigot joint in brass pipe cannot be obtained except by test of a full pipe joint, it is believed that because of the reduction of the wall thickness in belling and other factors, the bell-and-spigot joint is not as efficient as the butt type joint. Especially is this true in the larger pipe sizes and where the wall thickness exceeds ⅛ in.

2. Inasmuch as the cost of the bell-and-spigot joint, both in welding and in preparation, is very much greater than the plain butt type for the larger diameters, it is recommended that the butt type joint be used for all brass pipe having wall thickness in excess of ⅛ in.



Showing the boundary between base metal and weld metal. See text. Magnification X 100

New Sheet Lead Mill

A Modern Installation Recently Completed

THE new sheet lead manufacturing plant of the Flemm Lead Company, Inc., of Long Island City, N. Y., which has been under construction for several months, was opened for operation on July 1, 1934. The building and manufacturing equipment are entirely new and, being unhampered by the necessity for utilizing existing facilities, the designers were able to lay out and build a plant in which are incorporated modern features which are believed to make it the most complete and efficient sheet lead mill in existence.

The new building, similar in construction to and adjoining the present building, was designed by John M. Baker, Architect, of Long Island City, and erected by Merola Brothers, Inc., Contractors, of New York City. It is of brick and steel and provides floor space 45'0" wide x 175'0" long, to be used entirely for a sheet lead department.

The mill equipment, designed and built by the Farrel-Birmingham Company, Inc., of Ansonia, Conn., will produce sheets of any mixture classed as lead, up to 9'0" wide.

The Flemm Lead Company was incorporated and started its business in January, 1928, and has been manufacturing a line of lead products which are known to the trade as "Flemco" products, consisting principally of lead pipe, lead traps and bends, "Paramount" roof flashings, "Fit-All" cleanout plugs and many other lead specialties. The sheet lead equipment recently installed now puts the Flemm Lead Company in a position to manufacture a complete line of lead products.

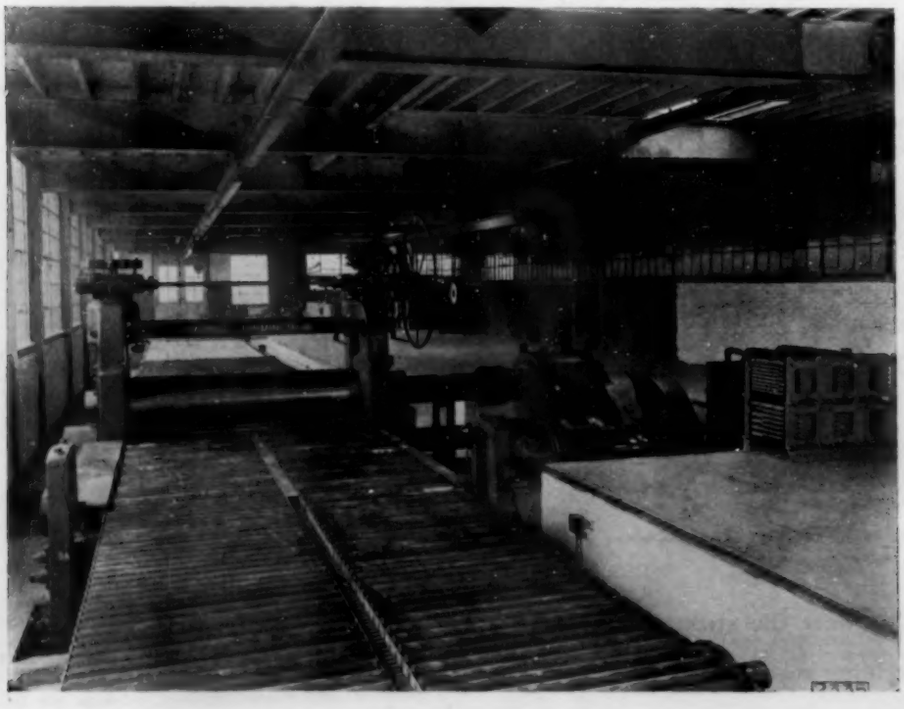
John J. Flemm, President of the company, has been connected with the lead business for the past sixteen years, having been superintendent and manager of the Andrews Lead Company for five years and for four years manager of the blue lead department of Marks Lissberger & Son, Inc., leaving the latter concern in 1928 to venture into his own business. In spite of the depression, the business has prospered and grown to such an extent as to make the present expansion possible.

The management of sales of the sheet lead division will be under the direction of J. A. O'Hare, who is well known in the industry, having been previously connected with the National Lead Company for fifteen years.

Casting Equipment

The melting pot of 15,000 lbs. capacity, is of special heat resisting cast iron. This pot is supported on the brick work of the combustion chamber. Surrounding the fire brick chamber is an insulating layer of Sil-O-Cel brick with an outer jacket of heavy sheet steel. The pot is oil-fired by Williams Oil-O-Matic burners.

Adjacent to the melting pot is the slab mold designed to cast a maximum billet 9'0" x 4'0" x 4". The mold is made with removable partition so that half size slabs can be made when desired. Piers supporting



Sheet Lead Mill, Flemm Lead Company, Long Island City, N. Y.

the mold are constructed to allow space below the mold for gas burners.

An "I" beam extends the length of the building over the slab mold and the mill tables and Wright Electric Trolley Hoists working on this "I" beam are used to lift the cast slab from the mold to the mill tables and to handle finished sheets.

Rolling Mill

To roll the cast slab into sheets, two chilled iron rolls 28" diameter by 114" face are used. These rolls are supported by brass bearings in heavy arch top housings of Meehanite (High strength cast iron). The top roll is counterbalanced and held against the roll adjusting screws by weights.

The slab is reduced to the required thickness by passing it back and forth between the rolls, the roll opening being adjusted between passes. A 10 H.P. motor operating through worm gearing and adjusting screws provides for rapid and accurate roll adjustment. The operator can read the roll opening at any time from a drum and pointer built as a part of the roll adjustment mechanism. The motor is provided with a solenoid brake to insure against over-running the desired setting. For fine adjustments of the rolls a manual adjustment is provided.

While lead is considered a soft, ductile material, considerable power is required for rolling. A 200 H. P. Westinghouse, wound rotor, A.C. motor is used to drive this mill. With this motor and its control a speed variation of 2 to 1 is obtainable without loss of torque. In order to roll antimonial as well as common lead sheets efficiently, both rolls of the mill are driven. This necessitated a pinion stand in addition to the gear reduction provided between motor and mill. The reduction from motor to mill speed is accomplished through two sets of Farrel-Sykes double helical gears mounted on Timken roller bearings in a heavy cast iron case. The pinion stand is built as an integral part of the gear drive, and the pinions are also the Farrel-Sykes, double helical, continuous tooth type. Between the drive and the mill, standard four-pod type spindles and couplings are used with spring-type spindle carriers.

Roller Tables

To support the material and to feed it into and receive it from the mill rolls, tables are required on each side of the mill. These tables are made up of a driven and an idler section on each side of the mill rolls and a finishing or cutting table on one side only. The total length from end to end of tables is about 113'0".

The driven sections are similar and extend approximately 14'6" each side of the mill. Each section is made up of 7 driven rolls, 8" in diameter on 18-5/8" centers, with two 3-5/8" rollers between each pair of 8" rolls. The tables are about 10'0" wide and provide for center as well as end support for all rollers. All rollers are mounted in anti-friction bearings.

The driven rollers must be actuated in correct synchronism with the mill rolls. They must be slowed down when the mill rolls slow down, speed up when the mill speeds up and reverse when the mill reverses. To accomplish this synchronism in the most direct manner, the table rolls are driven from the bottom mill roll through bevel spur gears. All gears are covered and provided with automatic lubrication by dipping in oil.

The frames supporting the rollers are made of welded structural and plate steel. Wells for lubrication of the table roller gears are built into the structure.

On the entering or furnace side of the mill the idle roll tables extend 25'8" beyond the driven section. On the finishing side of the mill these idle roll tables extend 30'3" beyond the driven section. The rollers of these idle roll sections are 3-5/8" diameter spaced on 5" centers. The rollers do not extend across the table in one piece. Two rolls each 4'8" long are used to make up the width of the table. Between the rolls extending lengthwise of the table is a rack 2" pitch, 3" wide, which provides fulcrum points for a bar when making small movements of heavy pieces of sheet along this table. All rolls are mounted in anti-friction bearings.

Finishing Table

The finishing or cutting table is 28'0" long. This is a maple-topped, structural steel table used for cutting sheets to suit specific requirements as to length and width. At the end is a capstan drum driven by a 5 H.P. geared head motor and along one side moveable idler capstans are provided. These capstans provide means for pulling cutting knives lengthwise of or across the sheet.

Sheet Cutter

In general the 4" thick slab is not reduced to its finished thickness in one piece. After the billet is reduced to a thickness of 1" or less it is cut into pieces. Each of these pieces is then reduced to the desired finish gauge. To cut the heavy sheet into pieces a sheet cutter is used. This machine is located on the furnace side of the mill between the driven and idle roll table sections.

Two circular cutter disks are mounted on nuts traversed across the sheet by screws. Cutting loads tending to deflect the screws are taken on structural steel members against which the nuts ride. The cutting unit, cutters, nuts, screws and beams are carried in substantial Meehanite frames and arranged to be lowered or raised in these frames. When lowered, rollers mounted on top of the cutter unit become a part of the idle roller table. When raised the unit is in position to cut across the sheet. The cutter is driven by a 10 H. P. motor.

Weighing Equipment

Two Kron scales are provided for weighing material during process of manufacture and for shipment. These scales are arranged to be operated with an I beam monorail and the electric hoists already mentioned.

At two different points in the monorail system 4' track sections are suspended from an overhead scale lever system which in turn is suspended from a steel superstructure. As the hoists and load are moved on to the live track section the weight is indicated on the scale dial which is pedestal mounted at operating floor level.

The gross capacity of each scale is 7000#. Each scale has a dial capacity of 3000# to a 2# graduation. It is also equipped with a tare beam to allow the deduction of the hoists and slings and a capacity beam of 3000# to take care of additional net weight in excess of dial capacity.

Treating Waste From Silver Manufacture

By ERNEST A. SMITH

Metallurgist

Various Types of Scrap Produced and The Methods of Handling Them to Recover the Metallic Values

THE need for economy in manufacture in these days of severe competition has become a very important matter, and the possibilities of recovering some value from scrap metal and other forms of waste in the silver and electro-plate trades cannot be neglected.

Long experience has shown that in all metal manufacturing processes there is always a certain amount of waste that is unavoidable; that is, in the working up of the metal there is always a certain portion that the manufacturer is unable to recover, and it is definitely lost even when every care is taken in collecting it and modern methods are adopted for its treatment.

In well regulated factories the net, or irrecoverable loss will probably amount at the lowest estimate to about 1 or 2 per cent of the total silver worked up in the various shops.

The Nature of Silversmiths' Waste

The various forms of silver waste may conveniently be considered under two main heads, namely, (1) Solid Waste and (2) Liquid Waste. In the category of solid waste are included scrap silver of all kinds, filings, etc., and sweep, and the various materials, such as buffing sand and lime, pumice, etc., used in the finishing and polishing processes.

In all these products the silver is present in the metallic state, but in some cases it is in an extremely finely divided condition. Under the head of liquid waste are included the various acid solutions used in pickling and stripping, etc., and old silver-plating solutions.

Modern Methods for the Treatment of Waste

The old methods of dealing with waste were in many ways very unsatisfactory from an economic point of view, and left much to be desired in regard to efficiency. It cannot be said, however, that these old methods have been altogether discarded and replaced by entirely new methods. The chief advances in the treatment of waste in recent years may be said to consist mainly of improvements in the methods of handling the different by-products rather than in the introduction of any new processes for the recovery of the silver. With modern improvements many of the difficulties which were associated with the old methods have been overcome, but it cannot with truth be said that the problem of waste has yet been completely solved.

From the technical point of view the chief advance has been in the form of the plant for more satisfactorily collecting the waste, and in preparing it in a condition most suitable for sampling and correct valuation. For example, the very fine dust from the buffing and finishing operations is now being drawn off by means of suction apparatus instead of being left to float about in the air and gradualy settle in all parts of the workshop.

Advantages of Direct Disposal

It must be pointed out here that a few large silver firms endeavor to make use of certain of their own by-products—more particularly clean scrap—but the great majority have found that it is more satisfactory and to their own advantage to sell all their waste to the smelters and refiners for the reason that very few silver manufacturers produce enough waste to justify the installation of the complete equipment for smelting and refining which its treatment entails. Not only have the large smelting concerns the necessary plant for the economic and satisfactory treatment of the waste, but they have also the necessary technical staff, and in addition have for many years made a specialty of this class of material. Such firms purchase the waste at a price based on the silver content less a small charge for smelting and refining, which of necessity varies according to the nature and quantity of the material. As the refiners deal with a great variety of waste products containing precious metals they are able to mix these products to the best possible advantage for the recovery of the metals at the lowest cost.

In these circumstances the treatment of silver waste naturally divides itself into two stages, the first being its collection and preliminary treatment by the manufacturer, preparatory to sale to the smelters, and secondly, its further treatment by the smelters for the recovery and refining of the silver. It will be seen therefore, that the actual recovery of the silver from waste and its preparation for further service in the industry are more particularly the concern of the smelting firms.

Treatment of Solid Waste

Scrap.—By far the most important solid waste from silver working is that which comes under the general

head of "scrap," which consists mainly of clippings from sheet and wire, which vary considerably in size and shape according to the class of articles being manufactured and the method of production.

For example from hollow-ware the cuttings will consist of comparatively thin sheets of all shapes and sizes, whilst in spoon and fork manufacture the scrap will consist of pieces of much thicker sheet and all the same shape according to the article that has been cut out or stamped from the sheet blank.

In works where considerable quantities of scrap are produced it is usual to sort it according to quality into standard scrap, consisting of clean clippings, etc., and common scrap, consisting of metal contaminated with silver solder or even soft tin-lead solder, and may include also old silverware that has been cut up for sale. This latter class of scrap is not infrequently contaminated with clippings of nickel silver, or Britannia metal and iron wire, etc.

Clean scrap, free from impurities, may be melted down direct and cast into ingots for the production of sheet or wire, and if proper precautions are taken in the melting and casting good malleable metal will result. Before being used, however, the metal must be assayed in order to determine to what extent the standard has been altered as the result of melting.

Common scrap is almost invariably sent direct to the refiners to be melted into bars, but these are frequently too hard and brittle to give satisfactory sheet or wire without some refining before casting and the addition of fine silver to bring them up to standard quality.

Filings and Turnings, etc.—These constitute another form of solid waste which in some works is produced in considerable quantities.

So far as possible all silver filings should be kept quite separate from clippings of clean scrap and provision made for collecting them separately. When filings get mixed with clippings, it is advisable to sieve them out so that the larger scrap may be left in a clean condition for melting.

Unless special precautions are taken scrap metal generally picks up more or less iron either in the form of filings or binding wire, etc., which is very detrimental to the casting, and it must be removed before the scrap is placed in the pot for melting.

Its separation is effected by means of a good magnet which is combed repeatedly through the heap of scrap until the iron is all removed. The same remarks apply to the presence of small amounts of nickel or nickel silver with which the scrap may have become contaminated.

After freeing from iron the silver filings may be melted and cast into a bar ready for sampling and valuation.

With silver filings may be considered the turnings and shavings resulting from silver turning or spinning. This class of waste is usually largely mixed with wood shavings which have to be burnt off before melting. Small lots can be melted in the crucible direct, the wood gradually burning off before actual melting takes place, but with larger lots it is usually more satisfactory to first burn off the wood in an iron pan in a muffle furnace. The bars obtained from the melting of turnings, etc., generally require some refining before they are malleable enough to use.

The Treatment of Sweep

We turn now to another class of solid waste in which minute particles of silver are disseminated through a large mass of valueless material. The first waste of this description to be considered is "sweep," which is produced in all factories where silver is worked, and forms an important item in stock-taking.

The term sweep sufficiently describes itself as it consists of the sweepings from all the workshop floors and benches and frequently includes the litter from the warehouse. This class of waste is one that may easily lead to serious losses if proper care is not taken in its collection and treatment. In most works the problem is dealt with by providing a large bin in which all the sweep is accumulated, and then sold periodically to the smelters usually once a quarter, or every half-year when comparatively small lots have to be dealt with. After the sweepings have been collected it is usual to pick them over and sieve them to remove any stray pieces of silver scrap and iron wire, etc.

Apart from scrap itself sweep is probably one of the most important waste materials resulting from the working of silver. Sweep heaps are anything but attractive in appearance but they almost invariably contain sufficient silver to repay the cost of treatment and yield a profit, even when they have been carefully sieved and picked over after moderately fine grinding.

This article will be continued in an early issue. —Ed.

Paul Revere—Poet

Paul Revere, made immortal by Longfellow, wrote a poem about Paul Revere long before Longfellow did. That Revere, goldsmith, silversmith, coppersmith, engraver, dentist, artist and horseback rider of parts, was also a poet was never known by even his immediate family until a short time ago when E. H. R. Revere, his grandson and official of Revere Copper & Brass, Inc., digging through trunks in the family attic, came across it. The poem, published in booklet form is being given away as a souvenir to visitors to the Revere House in the Colonial Village, World's Fair.

The following paragraph indicates his philosophy:

> The double-dealing hypocrite
> I try to shun, with all my might;
> The knave, I hate; the Cheat, despise;
> The Flatterer, fly; but court the Wise.
> The poor man's hope; the Widow's friend;
> The Orphan's guide; who often lend,
> Within my Cot, I'm pleased to find;
> Such men, congenial to my mind.

The final verse in the poem reads:

> At eve within my peaceful Cot,
> Sometimes I meet, and sometimes not,
> The Parson, Doctor; or some Friend,
> Our Neighbor kind, one hour to spend
> In social chat, our time to pass;
> Drink all our Friends, in parting Glass;
> The Parson, Doctor; Neighbor; gone;
> We prepare for Bed, and so trudge on.

In the Revere House the World's Fair visitors may see a copper bolt which was made by Paul Revere for the Constitution, popularly known as Old Ironsides. It was removed, for exhibition purposes, when that famous frigate was reconditioned in 1928. Here also is a copper sheet used to sheath the Constitution.

Paul Revere established the first copper rolling mill in the new world, according to records at the exhibit.

—L. B. C.

The Nickel Plating of Zinc in a Barrel

By ALBERT HIRSCH

Electroplater, Carey-McFall Company, Philadelphia, Pa.

The Details of a Successful Method in Actual Practice on a Production Scale

THE selection of the metal zinc for fabrication offers many advantages over other metals. Zinc, because of its softness can be worked in any shape or form with less trouble than many other metals, for example steel or brass. Again dies for fabrication will make more parts from zinc and last much longer. Also, if the weights of brass and zinc are compared, and the prices of the two metals, zinc will go further at about one third the cost of brass per pound.

Zinc has a use value advantage over many metals. Nickel plated zinc parts can be used in place of steel whenever the corrosion factor of steel enters the problem. In washable wearing apparel zinc is again advantageous as it will not rust stain the cloth as will steel, nor turn white goods green as will brass. There are many purposes to which zinc can be put at a saving, provided it can be nickel plated.

Method of Barrel Plating Zinc With Nickel

The author has successfully applied the following scheme to the preparation and barrel nickel plating of small zinc parts on a production basis of about 12,000 parts per day:

(1) Dry grinding.
(2) Cleaning.
(3) Copper Plating.
(4) Ball Burnishing.
(5) Cleaning.
(6) Nickel Plating.

The various stages are described in detail below.

Preparation of the Zinc Surface

The zinc surface is prepared by a process which the author terms "Dry Grinding". This consists of subjecting the fabricated zinc parts, as they come from the press covered with grease and drawing compound, to a process of grinding in a mixture of maplewood sawdust and powdered pumice stone in a horizontal barrel. The barrel is rotated at 30 r.p.m. for five hours. In this process the grease from the parts combines with the hardwood sawdust and pumice, and acts as a lubricant. The grinding removes all burrs left by the press operations together with the oxide film, and slightly roughens the surface of the zinc.

Cleaning

As all the grease and oil has been removed in the grinding process, cleaning is accomplished in baskets with a weak alkaline solution of the following composition:

	G./L.	Oz./Gal.
Na_2CO_3	30	4
Na_3PO_4	30	4
NaOH	15	2

Copper Plating

After rinsing in clear cold water the parts are barrel plated in a cyanide copper solution of the following formula:

	G./L.	Oz./Gal.
CuCN	22.5	3
NaCN	34	4.5

The parts are plated one half hour at 140-170°F. using 12 v. and a current of 400 amperes per load (approx. 4 amps/sq. ft.). This gives a copper deposit approximately equal to 5.2 g/sq. ft. of surface, which is thick enough to prevent the entire diffusion of the copper into the zinc with the subsequent blistering of the nickel deposit.

Ball Burnishing the Copper Deposit

The copper plated zinc parts are then ball-burnished for twenty minutes in a burnishing barrel, with 7/32" steel diagonals and a burnishing soap as a burnishing medium.

Nickel Plating

From the ball burnisher the copper plated zinc parts are cleaned in the above alkaline cleaner, rinsed in clear cold water and barrel plated in the following nickel solution:

	G./L.	Oz./Gal.
$NiSO_4.7H_2O$	105-210	14-28
$NiCl_2.6H_2O$	22.5-47.0	3-6
H_3BO_3	15	2
$NaBO_3.4H_2O$	0.75	0.1
NH_4OH	34-68	4.5-9.0

The figures for the amount of NH_4OH in the formula are approximate, as it is added to produce a pH of 7.6—8.0 as determined colorimetrically (using phenol red as an indicator).

The parts are plated for an hour using 6-12 volts, with a current of 200-400 amperes per load, (giving a c. d. of approximately 4 amps./sq. ft. at the higher voltage) at a temperature of 90-140° F. The nickel deposit is approximately equal to 10.08 g./sq. ft. of surface at the higher current density. The nickel plated parts are then finally ball burnished to a high lustre.

How to Estimate Plating Costs

By HAROLD KARET

Keystone Chromium Corporation, Buffalo, N. Y.

A Simple, Safe Method of Estimating Job Plating Costs, Developed by the Costs Committee of the Master Electro-Platers Institute of the United States

A REPORT READ AT THE FIRST ANNUAL CONVENTION OF THE MASTER ELECTRO-PLATERS INSTITUTE IN DETROIT, MICH., JUNE 9, 1934.

IN EVERY shop, regardless of how low work may be taken provided it is taken above production cost, there must be a point, theoretically, at which with sufficient volume of business that shop can operate without showing a loss. No business man in his right mind wants to set his prices so low that it becomes necessary to operate his shop beyond capacity or even to capacity in order to keep from showing a loss.

The first object of this Committee, therefore, is to determine a method of cost finding based, not on 100% shop capacity, but on some figure below 100%, so that with slack business it is possible to operate without losing money and making possible profitable operation in normal times.

One of the major abuses in industry is the feeling that the less business available, the lower must be the selling price. If this one abuse can be corrected, we shall have accomplished much. It is not unreasonable to assume that a shop is entitled to operate without a loss when at 65% of its capacity. Let us assume, then, that a certain shop, working entirely on bright plating, has an accurate method of figuring costs, and, based on normal profits, cannot produce more than $10,000.00 per month. If all work is figured accurately, they will be in the red below $6500.00, break even at that figure, and make a profit above that figure.

Now, let us try to analyze this picture. A study, over a period of years, with labor rates varying about 25% shows that 41% of the selling price of plating goes to direct labor of production, including supervision, shipping, maintenance of equipment, and office salaries exclusive of executive officers. Of these items, the one we can most accurately determine is polishing labor. It also happens to be the one which varies more than any other. We, therefore, in our figures, must assume a unit. The unit we have chosen is based on the hour, and all figures will be based on 60 minutes or 60 units to the hour.

Let us remember, now, that we are talking of a $10,000.00 production limit shop doing $6500.00 per month. This means that he must reasonably assess these units so as to produce enough dollar sales to equal $6500.00 at 65% capacity. In order to do so, it is necessary to figure as follows.

Take the number of minutes of time spent on polishing preparatory to plating, and add to it double the number of minutes necessary for buffing after plating as the plating cost is approximately equal to the buffing cost. This will give a fairly accurate method of arriving at the total direct productive labor, and is about the only figure possible to easily determine for the regular run of work.

Let us take the following case as an example.

Direct Labor Costs on Piece A.

	Time	Units
Polishing	45 minutes	45
Copper Buffing	15 "	30
Nickel Buffing	15 "	30
Chromium Buffing	5 "	10
Total Units		115

This figure of 115 Units represents a fairly close estimate of the total time Units taken by direct labor in polishing, buffing and plating the article. Note that the buffing time has been doubled to get the total Units, based on the assumption that the labor involved in plating is about the same as the labor involved in buffing. (This assumption is justified by records of operation of a number of representative shops).

It really means that a total of 115 Units of direct labor has been put on Piece A.

To get a selling price, we must multiply this 115 Units by the labor cost, which will give us the dollars and cents cost. If the labor cost is 60c. per hour, multiply 115 Units by 1c., which equals $1.15. If the labor costs 90c., multiply 115 Units by 1½c., which gives $1.72½. This will be the Total Direct Labor Cost.

By multiplying this figure by a Factor, to be determined in each locality or district by the individual District Code Authority or Committee, the selling price will be determined.

In actual operation, the calculation can be simplified by the use of a factor to apply to the number of Units. This factor varies with the rates of labor, but the following table has been set up to cover a range.

Polishing Labor Rates	Factor
60 c. per hour	3
70	3½
80	4
90	4½
1.00	5

Therefore in the case of Piece A, described above, the selling price will vary as follows

Polishing Labor Rates	Factor					Selling Price
60c./hr.	3	x 115	Units	or	Minutes	=$3 45
70	3½	x 115	"	"	"	= 4.02½
80	4	x 115	"	"	"	= 4.60
90	4½	x 115	"	"	"	= 5.17½
1.00	5	x 115	"	"	"	= 5.75

By this method we allow for a variation of other cost figures along with the productive labor.

We are assuming that every shop is in business to make money, although most of us have kept this idea closely guarded from our customers. How far the NRA will permit us to go in standardizing cost figuring is questionable at this time.

The committee on costs has available to it figures on plating with cadmium, zinc, and other unpolished types of plating, including mechanical and hard chromium deposits. It suggests that a Bureau for the distribution of this material be set up within the Master Electro-Platers Institute so that this information, as is tabulated, can be distributed to all members of the Institute.

For example, we have charts giving the weight per 100 pieces on round, hexagon, and square stock of brass, copper, or steel in sizes from 1/16" x 1/16" long up to 1½" x 6" long, with 1344 separate figures on each one of these sheets. This same information is available for sheet metal and is to be the nucleus for figures on unpolished protective coatings.

We would also have information from thirteen picked shops giving the percentage sales in their shops, broken down into 18 parts, such as labor, officers' salaries, rent, heat, light and power, down to such insignificant items as interest, insurance, advertising, and profit. An interesting note I would like to make in connection with these figures is that seven of the thirteen shops do not advertise, and the other six average only .6% with .8% the highest figure. This one item clearly shows how little effort is put forth in our industry to stimulate business. I could go on and on talking about many of these and other items, but that is not within the scope of the Committee.

We are also working on a standard form for figuring costs, together with uniform quotation sheets which will show the buyer what he is going to purchase and will protect the seller against the disagreeable task of making adjustments after work is billed.

Great good has already been accomplished in the industry through the activities of the Institute, and surely, as we go along, much more can be done.

Additional Notes on the Platers' Convention

THE report of the Annual Convention of the American Electro-Platers' Society, held in Detroit, June 11-14, which was published in our July issue, omitted inadvertently, some of the papers read at that convention.

A paper on **Solvent Degreasing of Metals** was read by **F. E. Barron** and **M. Marean** of the Dupont Chlorine Products Division, E. I. duPont de Nemours & Company, Wilmington, Dela. The authors summarized the major advantages of solvent degreasing as follows:

1. Lower overall cleaning costs due to savings in power, heat, labor and material for subsequent operations.
2. Uniformity of results, since all oils, greases and waxes are dissolved with equal rapidity.
3. Rapidity of operation, permitting large outputs from comparatively small equipment.
4. Elimination of the human element, thereby reducing rejects due to improper cleaning.
5. Ability to clean all metals without attacking or damaging polished surfaces or delicate objects.
6. Ability of the process to clean work already racked or wired for plating, thus eliminating handling the cleaned articles.

J. Hay read a paper entitled **"What Effect Has the Shape of the Electroplated Article on Throwing Power?"** The author showed, with samples of plated parts and also with slides, the variations in the thickness of the deposit under different conditions. Sometimes when engineers design an automobile, to please the public by its attractiveness, they do not realize the burden they place on the manufacturer and also on the plater, who has to contend with difficult shapes.

A Method of Costing Plated Parts was described by **R. M. James**, in which he outlined a system which would enable the shop manager to know the cost of each individual job. He illustrated his system with the cost details of plating and finishing a quantity of electric iron covers. The costs on this job were as follows:

Direct Labor	$4.5352	per 100
Overhead	4.7894	per 100
Material	1.2600	per 100
Total Cost	$10.5846	per 100

We show below a portrait of Philip Sievering, Jr., which reached us too late to be included in our July issue. Mr. Sievering was elected second vice-president of the Master Electro-Platers' Institute of the United States. He is also a member of the National Executive Committee, representing the New York District.

PHILIP SIEVERING JR.

Boulder Dam Project Will Require Over 30,000,000 Pounds of Copper

A HUGE tonnage of copper—estimated at more than 30,000,000 pounds—is being used in the vast projects affiliated with the construction of Boulder Dam.

An ultimate total of 15,753,000 pounds of Copper will be required in the building of high voltage power transmission lines in connection with the Colorado River Aqueduct project of the Metropolitan Water District of Southern California. This material will be used for (1) the construction of lines furnishing electricity for camp and construction use along the aqueduct line, (2) the erection of lines to transmit Boulder Dam power to the aqueduct for pumping purposes.

Already 3,700,000 pounds of copper have been consumed in building the construction power system, which includes 450 miles of 66,000 and 33,000 volt line. This system will be in operation only while the projected aqueduct is under construction.

The first development of the 220,000 volt transmission line from Boulder Dam will require the use of 6,795,000 pounds of copper, while the second development will consume 5,258,000 pounds. These lines will carry 36 per cent of the total electric energy to be generated at Boulder Dam, the Metropolitan Water District of Southern California being the largest consumer of Dam power. In building the construction power system, the District has purchased more than $350,000 worth of copper and $594,000 worth of electrical equipment, which includes 122 transformers.

Approximately 1,620 miles of hollow copper conductor weighing 13,454,000 pounds is being used on the Boulder Canyon transmission line being constructed by the Los Angeles Bureau of Power and Light. The conductor has a diameter of 1.4 inches and weighs 1.57 pounds per running foot. The tubes are formed of ten copper strips keyed into each other much after the fashion of tongue-and-groove flooring, at the same time being laid at a slight angle somewhat resembling rope. This will be the largest hollow cable installation in the world and will operate at 287,000 volts . . . 67,000 volts higher than any transmission line ever erected.

Lighting protection for most of the 270-mile double circuit line will be provided by hot rolled black copper rod as buried ground wires or counterpoises. One thousand miles of quarter-inch material will be required, weighing 1,256,000 pounds. However, for a distance approximating 40 miles, where both circuits are carried on a single tower, copper-covered steel wire strand will be used as ground wires running continuously along the tops of the towers.

Immense additional quantities will enter construction of two switching stations and a step-down station on the Bureau of Power and Light's line, and in making electrical equipment for the Boulder Dam power plant.

About 1,500,000 pounds of copper will be used in erecting the Boulder Dam's large power plant and switching station.

Enormous as is the Boulder Dam project, it is dwarfed into comparative insignificance by the surrounding terrain. When completed the entire area in the background will be converted into a vast lake.

Wide World Photo, Courtesy of Copper and Brass Research Association.

EDITORIALS

The State of Trade

THE Spring rise has come and gone. Summer is here with its usual decline. How great is this decline? Is it seasonal in size, or more, or less? In view of the generally unsettled situation with its many doubts and fears and in view also of the many statements from interested partisan forecasters on both sides, this summary will attempt to be statistical in character, giving facts where possible, rather than opinions.

The total number of unemployed workers, in accordance with the National Industrial Conference Board, fell from about 8,600,000 in March to 7,900,000 in May, and then rose again to 7,935,000 in June. At the same time payroll disbursements rose in March and April. The cost of living has fluctuated by fractional percentages, rising in March, falling a little in April and rising again in May. Individual indicators, such as orders received and sales billed by the General Electric Company for the second quarter of 1934, showed healthy increases. Shipments of electric refrigerators also rose steadily. Late figures show a decline in production and trade of more than seasonal proportions in June and the first half of July, according to detailed reports from the Conference Board, which included building and engineering construction, steel production, coal production and, retail trade in department and chain stores. The cost of living advanced again slightly in June. The New York Times Weekly Business Index stood at 80 for the week ending July 21, against 79.3 for July 14, about 85 in June and 95 for the same time last year.

It is an open secret that we are far from being on an even keel. To be sure we are a long distance above the bottom of the trough, but that is past history. We cannot base our estimates on what happened in March, 1933. We are still below normal operations. It is necessary for considerable improvement to occur before our economic condition can be considered healthy. The situation is badly complicated by political controversies, differences of opinion about the effect of the N. R. A., etc., but there has never been a time when politics and economics were so closely entwined.

An unbiased estimate seems to be that we had a very fair Spring, but that the Summer decline is steeper than seasonal variations can account for. Our hopes rest on the coming Fall.

Collective Bargaining

THE leading issue of the day is still labor relations. We have had strikes and threatened strikes in greater proportions than at any time in the last generation. The lines are sharply drawn up, at least in industry, between unionism and non-unionism.

This issue is quite clearly explained in two articles in a recent issue of the Rotarian, which presented both sides of this question.

The Employee Representation Plan, often called the Company Union Plan, is put forward by T. M. Girdler, Chairman of the Board of the Republic Steel Corporation. He states that "the steel industry is definitely not opposed to collective bargaining. The point at issue is the form of collective bargaining, which is to be adopted . . . The steel industry believes that the employee representation plan is the best for employees as well as employers." They have refused to recognize the unions because trade unions mean eventually the closed shop which, in their opinion, is absolutely contrary to the best interests of both employees and employers, also in violation of Section 7-A of the National Industrial Recovery Act, which guarantees to all employees free choice of the method of bargaining with employers. It is their belief that collective bargaining may best be accomplished by the establishment of self-governing organizations within the industry, whereby employees are free to elect representatives to deal with employers upon questions of wages, hours or working conditions and all other matters of mutual interest. Mr. Girdler denies that management controls the affairs and decisions of "company unions." They must, he states, in order to function effectively, allow the employees to the right of independent meetings, elections and decisions. Participation must be voluntary. An employee may belong to any type of organization which he chooses and be free from any type of discrimination. The basic principle is free choice.

The other side, favoring trade unions, is presented by Congressman William P. Connery, Jr., chairman of the House Committee on Labor. Mr. Connery is convinced that these so-called company unions are a device to defeat independent action by labor; that they are controlled by the management; their officers practically appointed by the management and their conclusions dictated by the management; that their sole purpose is to prevent a majority of the workers from forming or joining a legitimate trade union of their own choosing. As proof he cites the fact that salaries and expenses of the officers of the "company dominated union" are paid directly or indirectly out of the funds of the employer.

Based on these two articles, the question at issue seems not one of principle, but of operating practice. Both parties agree that free choice is essential. Mr. Girdler states that the men have it and Mr. Connery states that they do not have it, in the company union.

We can easily agree with the principle, namely, free choice. We have no reliable information, however, which will settle the question as to whether or not company unions in the main are independently controlled by the men or subject to company domination. Undoubtedly, plenty of examples can be found on both sides. It is probable that both company unions and trade unions suffer in reputation from their worst examples.

An interesting and broader point of view is given by a survey of the National Industrial Conference Board which includes information from almost 2700 companies employing over 2,000,000 wage earners. It seems that collective bargaining is increasing, although the rate of increase is diminishing. The proportion of employees dealing individually with their employers declined from 48.9% of the total in November, 1933, to 43.8% in May, 1934. Employees under company unions increased from 43.2% to 46.5% and in labor unions from 7.9% to 9.6%.

It is highly indicative that the individual basis of employee and employer dealings still predominates in small establishments. In companies with less than 100 employed, 88% are still dealing individually. Employee representation is most general in the very large companies.

It would seem to the unbiased observer that the best way for both sides to further their plans would be to exercise extreme care in the honesty and efficiency with which they operate. We repeat that both sides suffer from their worst elements.

The National Budget

THE national budget used to be a problem for political discussion and pork barrel manipulation. For the last twenty years, however, since business and industry have contributed the major part of Government income, directly or indirectly, these considerations have assumed importance to every individual who operates a business or pays income taxes.

On July first, the Treasury gave an accounting of the Nation's financial affairs, which showed a deficit for the past fiscal year (ending June 30, 1934) of $3,989,000,000, or $3,629,000,000, with the sinking fund for debt retirement excluded. This is far below the estimates of the Government a year ago, which predicted a deficit of about $7,300,000,000. The outlays were divided into two parts, about $3,100,000,000 for ordinary expenditures and $4,000,000,000 for emergency purposes. Receipts were about $3,115,000,000 which covered the ordinary expenditures, leaving the emergency outlays in the deficit.

Prospects for the coming year, according to the President's forecast in January were a deficit of $2,000,000,000 and a balanced budget for 1936. This, however, as everyone knows is dependent upon the extent of business recovery.

Alchemy Versus Investigation

AN interesting report recently published in the daily press describes the investigations of J. W. Wilson, a medieval scholar, who has been studying the alchemical manuscripts in American libraries with their weird formulae for the conversion of base metals and other materials into gold and silver. According to Mr. Wilson the secrets of the alchemists were for the most part pure nonsense of course, but they do have their bearing on present day metallurgy by contrast, if nothing else. For example, a formula for converting copper into the best gold, called for keeping hens in captivity feeding them beans, taking 15 eggs from these hens and putting them in a secret place, allowing them to stand until they were reduced to one, then placing tin in a furnace with these eggs and reducing the combination, which would result in the best gold, "if you know how to operate wisely." Other formulae called for live lizards, toads, daffodils, dragons' blood, human blood, etc.

Nonsense, of course, but interesting enough, there were grains of sense in some of the early alchemical rituals which have been handed down and preserved in modern practice. But contrast them with the methods of to-day. The scientific study of metals rests on the work of the early important metallographers, like Sorby, Martens, Osmond, Howe, Sauveur, Roozeboom and others. To trace, step by step, the progress of metallurgy from the foundation, calls for more space than we have available here, but it is enlightening to list some of the recent present day results of systematic research, as given by Dr. Samuel L. Hoyt, in a recent talk before the American Association for the Advancement of Science, in Cambridge, Mass.

Confining ourselves largely to the non-ferrous metals, we find such developments as "powder metallurgy," the manufacture of articles made of single metals and mixtures of metals in powdered form. This was first made commercial in the form of tungsten as a lamp filament. Some of the other products of powdered metals are the new oilless bearings, tungsten-copper welding electrodes, and electrical contacts.

Heat resistant alloys composed largely of iron, nickel and chromium are vital parts of equipment which operates at elevated temperatures, and as electrical resistance elements, in industrial electric furnaces and electrical household appliances. We now have copper brazing in an atmosphere of pure hydrogen, preventing oxidation in the process. We have bright annealing to avoid scaling. We have vacuum melting of metals and alloys. We have electric melting by the arc and by induction. It is worthy of more than a small note that welding is steadily forging ahead as a standard process in manufacturing operations. Dr. Hoyt does not exaggerate when he says that metallurgy deserves to be acclaimed as one of the most important economic factors in modern industry.

The practical point of view regarding research was well stated by Dr. Foster D. Snell. The five ways in which a research department should justify itself are: 1. Reduced cost of product to the consumer; 2. Increased margin of profit to the manufacturer; 3. Increased appeal to consumer; 4. Increased field for utilization of product; 5. Increased business through introduction of profitable new products.

This is not only an excellent summary of what research should mean in industry; it is also the reason why research has grown to huge proportions as a practical aid to practical business.

Platers' Code Coming Soon

REPORTS have been received from the Code Committee of the Master Electro-Platers' Institute that the Code is very near to approval. Changes have been made as required by the Administration but these changes are minor in character and do not vitiate the Code.

It is too early as yet to speak with absolute assurance but the revised draft of the Code leaves it a good document. It is so framed as to allow local autonomy; it contains provisions to cover emergencies; it will give the industry real power to govern itself.

Let it come! The industry needs it.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

Gold Solution

Q.—I am sending under separate cover samples of 2 gold solutions, also sample of goods plated in No. 1 solution.

I only recently took over these solutions so I don't know the original formula. I would appreciate it very much if you would send me an analysis of same, also what information you could give me; why the neck of 2 of the enclosed articles do not plate as the comb part does. The neck is brass and the comb is die cast brass plated. The other two were finished about a week ago and are lacquered, the neck showing a red shade.

Will you kindly send me a formula for a gold bath using cyanide of gold and instructions for the upkeep of same.

Most of the formulas that I have seen contain fulminate of gold.

Which solution do you consider the best to use?

Sol. 1 is 37½ gal.

Sol 2 is 24½ gal.

The anodes are 24 K gold 7" x 7/8"; using 4 in each tank.

In plating this comb we plate 72 at one time. The distance between anode and cathode is 6".

A.—Analysis of No. 2 gold solution:

Metallic gold	1.04 pwt.
Free cyanide	.55 oz.

The gold content of the solution is too low and should be increased to 4 pwt. per gallon.

The uneven deposit is due to the difference in the alloy of the parts of the work. It would be good practice to plate the work for a few minutes in a good operating brass solution before gold plating, and then the color of the deposit will be uniform. Either gold fulminate or gold cyanide can be used in preparing or replenishing gold solutions. Gold cyanide can be purchased ready for use while the fulminate is usually prepared by the one who wishes to use it.

Formula for gold solution:

Metallic gold as fulminate or cyanide	4 pwt.
Sodium cyanide	1 oz.
Phosphate soda	1 oz.
Water	1 gallon.

Operate solution at 120° to 140° F., using one volt.

The bottle that contained sample of No. 1 solution was broken in transit, so if you will send us another sample, we will analyze it for you.

O. J. S. Problem 5,310.

USE THIS BLANK FOR SOLUTION ANALYSIS INFORMATION

Fill in all items if possible.

Date.....

Name and address: .....**Employed by:** .....

Kind of solution: .....**Volume used:** .....

Tank length: .....**width:** .....**Solution depth:** .....

Anode surface, sq. ft.:.....**Cathode surface, sq. ft:** .....

Distance between anode and cathode: .....**Kind of anodes:** .....

Class of work being plated: .....**Original formula of solution:**.....

REMARKS: Describe trouble completely. Give cleaning methods employed. Send small sample of work showing defect if possible.

Use separate sheet if necessary. _____

_____

_____

_____

NOTE: Before taking sample of solution, bring it to proper operating level with water; stir thoroughly; take sample in 2 or 3 oz. clean bottle; label bottle with name of solution and name of sender. PACK IT PROPERLY and mail to METAL INDUSTRY, 116 John Street, New York City.

Melting Gold, Silver and Nickel

Q.—I am writing for information pertaining to the building of a furnace for melting metal and the best material to use for moulds in which to take the imprint for fine engravings. Can you please help me out on this subject or give me the name of a book containing this information? How do you build a furnace for melting gold, silver and nickel? What material would I have to use to build this furnace? Where could I purchase the material with which to build this furnace? I would like to build a small furnace, of course. What is the cheapest way I can melt these metals? Can I melt silver and nickel without a furnace? Is plaster of paris a good material to use for taking a print of a fine engraving? What material is best to use for moulds in which to cast medals and other fine engravings?

A.—As you require a furnace for melting nickel, gold and silver, we think it would be much more economical for you to purchase one of these furnaces already fitted to operate with oil or gas. Any such firm advertising in **Metal Industry** can supply you with the furnace that will be capable of doing the work. While we could give you a rough sketch of a furnace that could do the work you would be obliged to secure a burner capable of giving you the heat necessary to melt nickel. Therefore, it would be to your advantage to purchase a complete furnace of the capacity you require.

We do not know of any way to melt silver or nickel without a furnace.

In reference as to what material to use for taking prints of fine engravings plaster moulds are used for such work, also for dental work. Considerable experience is necessary to be able to handle plaster moulding properly. A visit to your local dentist would give you an idea of the work.

For gold, charcoal block is sometimes used for the mould. Also it may be necessary to use sand at times. A very fine grade of sand is used. W. J. R. Problem 5,311.

Manganese Bronze

Q.—We have experienced some difficulty in running manganese bronze castings. Our castings of this metal will vary from ¼ lb. to 5 lbs. each. They seem to have quite a few zinc spots on the surface and the metal does not run or nit just right.

Would you be good enough to advise how this metal should be run down in the furnaces, at about what temperature it should be poured and just about how the castings should be gated?

We operate large oil furnaces.

A.—It is rather difficult to advise as to how your castings should be gated unless you send in a sketch of the style of casting you are making.

However, for general instructions on gating, there should be as few gates and runners as possible and in almost all cases they should be joined in the bottom of the casting. The less the metal is agitated in pouring, the cleaner it will be from dross and oxide, and the better will be your casting.

As your castings are light—¼ lb. to 5 lbs.—we would suggest a long run gate for a runner as you may have more than one pattern in a mold.

You state you have zinc spots on the surface and that the metal does not run just right. This would indicate the metal is at fault. It is usually best for brass foundries to purchase the manganese bronze in ingot form, rather than attempt to make it. However, it can be done if you so desire.

As you melt in large oil melting furnaces, this should be satisfactory, as the Hawley Schwartz Furnace is a very successful furnace for melting manganese bronze, due to the ease of poling the metal, thereby thoroughly mixing so that it is absolutely uniform.

To melt the metal in an open flame oil furnace, first see that your furnace is good and clean and the lining smooth inside. Then have 45 pounds oil pressure and 20 to 22 ounces of air. Heat your furnace up well. Charge your metal. With the charge add a shovel of flux composed of

80%	coke dust
5	fluorspar
10	lime
5	common salt

Heat the metal until it flares zinc fumes freely. Stir well and pour at approximately 2,000° F. Heat the ladle that is to receive the metal. If your ladle is not properly heated the metal will boil and all castings poured from such metal will be found dirty and drossy. In open flame oil furnace melting, the condition of the ladle is more important than the condition of the furnace.

We do not know the class of work you are doing but this general outline may be of assistance.

W. J. R. Problem 5,312.

Gold Salts

Q.—As subscribers to **Metal Industry**, we wish you to tell us the best way to prepare gold salts such as are sold in the market, ready prepared to dissolve in water.

The referred salts contain 40% fine gold and we suppose double gold potassium cyanide but want to know the exact and safest way to prepare such salts.

A.—The following procedure should be used in making the double gold and potassium cyanide.

Take one ounce of fine gold and cut in small pieces. Place in an evaporating dish and add 8 ozs. of aqua regia (aqua regia is made by using two parts of c. p. hydrochloric acid and one part of c. p. nitric acid).

Place on sand or hot water bath under a hood, and when the gold is dissolved, dilute with water to one gallon. Then add 26° ammonia cautiously until the solution has a faint trace of ammonia. This can be determined by the odor or when red litmus paper turns blue. Stir thoroughly and let stand until the precipitate settles. Then decant or syphon off the water. Then add water and syphon off 2 or 3 times, or until the solution contains no more ammonia. With the last syphon off operation, as little water should be left as possible.

The gold is now in the form of gold fulminate which should not be allowed to dry as it is then very explosive.

Dissolve 2 ozs. of potassium cyanide in one pint of water, and add it to the fulminate of gold which should produce a clear solution. You now have the double gold and potassium cyanide in solution form. If wanted in the crystal form, place it in the evaporating dish and place on sand or hot water bath to expel the water. O. J. S. Problem 5,313.

Defective Nickel and Copper Solutions

Q.—I am sending you a nickel and copper solution for analysis. What is wrong with them?

A.—Analysis of nickel solution:

Metallic nickel	3.30 ozs.
Chlorides	1.42 ozs.
pH	6.2

The chloride content is too low and the pH too high. Add 1 oz. of sodium chloride to each gallon of solution, and to each 100 gallons of solution add 2 fluid ozs. of sulfuric acid.

Analysis of copper solution:

Metallic copper	3.46 ozs.
Free cyanide	.27 oz.

The free cyanide content is too high. Add three-quarters of an ounce of sodium cyanide to each gallon of solution that the tank contains. O. J. S., Problem 5,314.

Chromium Plating

Q.—Please give me the following information on chromium.

1. The most practical method on analyzing solutions.
2. Is the hydrometer reading in a chromium bath practical?
3. Must I have a patent to use chromic acid and sulphuric acid solutions?
4. What voltage and amperage are required, temperature, etc.?

A.—Due to the patent situation in chromium plating, we are unable to answer any questions on this subject. We would suggest that you get a copy of the publication by R. Schneidewind published by the Department of Engineering Research, University of Michigan, Ann Arbor, Mich.

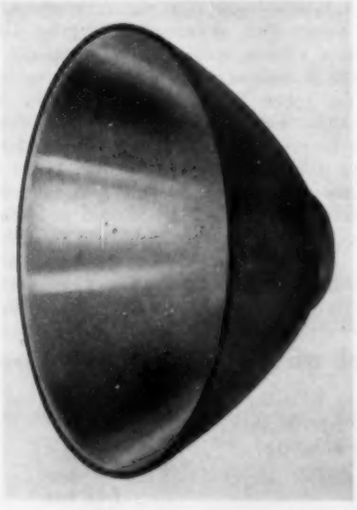
Ed. Problem 5,315.

Equipment

New and Useful Devices, Metals, Machinery and Supplies

Bakelite Baking Type Finishes

AT the outset of the twentieth century Dr. L. H. Baekeland succeeded in creating from the interaction of phenol and formaldehyde a resin-like substance which he called Bakelite Resinoid. It was discovered that this substance could be treated in various ways to yield molding materials, laminated sheets, rods, and tubes, transparent cast resinoids, tenacious bonds for grinding wheels, and an extremely wide variety of other products which found ready acceptance in industry. An important group in this extensive family of Bakelite materials

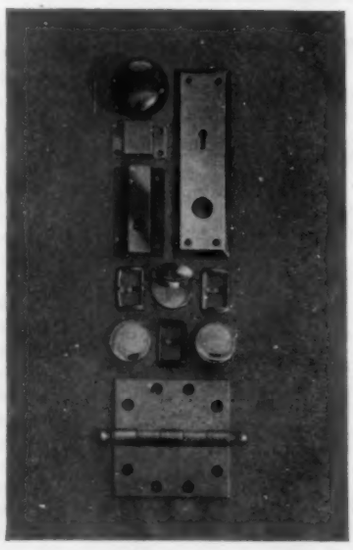


Floodlight Reflector with Bakelite Enamel

made by the Bakelite Corporation, 247 Park Ave., New York, are the baking type finishes—varnishes, enamels and lacquers, which provide hard, continuous, uniform, protective coatings for metal. They are obtained by dissolving the initial resinoid in solvents such as alcohol and acetone.

As a finishing material Bakelite varnish possesses many outstanding characteristics. It is non-hygroscopic and is unaffected by extremes of climates. It does not deteriorate and is resistant to water, alcohol, acetone, benzine, and other common solvents; oils, greases, organic acids, dilute mineral acids, and soapy compounds. When converted to its final durable state through the baking process, it does not melt at any temperature and will not char at temperatures up to 375° F.

The enamels differ from the varnishes in that they have slightly higher viscosity and are mixed with color pigments or fillers. Otherwise the method of manufacture, properties, and classifications of use are not greatly different. As a protective coating, phenol resinoid enamel offers resistance to extreme weather conditions, heat and humidity, and affords effective protection against most chemical reagents.



Metal Parts—Bakelite Lacquered

When baking type Bakelite lacquer has been applied to a surface and the solvent has been allowed to evaporate, a thin film of resinoid remains. Subsequent heat treatment converts this film into a final state of durability and insolubility,—a process called polymerization. In this final state it is high in surface protective value. These lacquers are available in a clear, transparent, light amber color. Where required, however, they may be furnished in a state practically colorless when employed for the surface protection of silver, etc. Phenol resinoid lacquer is practically non-porous and non-absorbent. When properly applied and thoroughly backed, the surface will not crack nor scale and cannot be peeled by finger nail or knife blade. It is odorless, an important feature. It is unusually tenacious and will not soften at any temperature, and therefore may be employed for products designed for use in the tropics. Bakelite lacquer possesses a marked ability to withstand the effect of high humidity, salt water, solvents, and climatic action. The lacquer film is uninjured by perspiration.

Gurley Transit Protected with Bakelite Lacquer

In order that the baking type finishes may be employed to best advantage, special Bakelite thinners are available. Though these finishes are applied by standard methods, that is, by dipping, brushing, and spraying, there are certain variations in technic, particularly from the standpoint of heat treatment. For this reason, literature has been published by Bakelite Corporation giving complete data as to the properties, uses, and methods of application.

Latest Products

Each month the new products or services announced by companies in the metal and finishing equipment, supply and allied lines will be given brief mention here. More extended notices may appear later on any or all of these. In the meantime, complete data can be obtained from the companies mentioned.

Gas Lift Truck. Maker has added to its line of electrics and gas-electrics a new gasoline driven unit of 3-ton capacity for inter-plant trucking. Elwell-Parker Electric Company, Cleveland, Ohio.

Furnaces. Round and rectangular pot type, for lead, babbitt, salt, heat treating small parts, experimental work, melting, etc., at temperatures up to 1650° F. (Described in Bul. HD-534.) Hevi Duty Electric Company, Milwaukee, Wis.

Special Bearings, Bushings, Fittings and Small Parts of Permite Leaded Phosphor Bronze Bars. Aluminum Industries, Inc., Cincinnati, O.

High Speed Die Casting Machine Using Hydraulic Pressure. Pressure Castings, Inc., Cleveland, O.

New Production Spray Gun

During the past 5 years finishing methods have changed considerably. This is due largely to the fact that solid content of materials has been increased, making them more difficult to break up and apply with the ordinary spray gun. Also new finishing materials have been developed which it has been found difficult if not impossible to apply with the ordinary type of equipment in many cases. Then too production speeds have been increased.

H. D. Binks, president of the H. D. B. Corporation, 900 N. Spaulding Ave., Chicago, Ill.* has designed a new gun keeping in mind those points essential to the requirements of the finishing industry today, namely—perfect finish, less material wasted and, high production speed.

This new H. D. B. No. 5 Gun, it is stated, has produced startling results in the various fields into which it has been introduced, and is said to be unique in

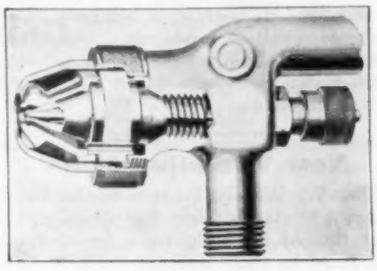
H. D. B. Spray Gun

body design giving perfect balance, having all moving parts constructed in one line to eliminate off-side pulls, and it will operate consistently over a much longer period than is customary without replacement of any of the parts.

Perhaps the most important single feature is the new type nozzle head. It operates on an entirely new principle, producing a very highly atomized break-up of material, yet with actual forward speed of the spray reduced to such an extent that a very noticeable portion of the usual spray mist is eliminated, as the material does not hit the surface at the usual high speeds. Another advantage claimed for the slower speed spray is that material which has already been applied and which is still wet is not rippled as formerly. That is what caused the orange peel effect.

Results Reported on Tests

1—At the plant of a large manufacturer of household utilities. (a)—On this special job, material consumption was cut from 3 quarts to 2.2 quarts per unit, showing a saving of over $300.00 per day on material costs alone. (b)—Rubbing time cut in half. (c)—Spotting of light areas practically eliminated due to the very uniform spray. (d)—Production increased. (e)—Formerly



Detail of Nozzle

gloss and finish was considered only fair—now it is the finest.

2—In an automobile plant. (a)—Approximately 15% material saving on application of lacquer. (b)—Speed of application stepped up—now 50 medium sized bodies per hour. (c)—Elimination of most of the sanding on lacquer coats requiring scuffing because of dirt.

3—A large manufacturer of products requiring synthetic enamels. (Formerly results were erratic—much work rejected because of lack of gloss, and presence of "orange peel" effect. On some days finishing production slowed down to about ½ speed to obtain a finish that would pass inspection.) With the new H. D. B. No. 5 Gun : (a)—Secured glass-smooth finish with extremely high gloss. (b)—Finish consistently perfect under all conditions of operation. (c)—Speed of finishing increased over production rate of rest of plant. (d)—90% of the synthetic enamel touch-up eliminated.

The manufacturers will be glad to arrange for a trial without obligation to any user of spray equipment.

*This gun was erroneously reported in our July issue as being made by another manufacturer.

Corrosion Preventive

Several years ago, in an effort to reduce replacements and maintenance costs on metal parts, the Western Union Telegraph Company tried to find some method of protection against corrosion, which would be more permanent than that provided by paint or lacquer alone.

In furtherance of this effort, Dr. Leo P. Curtin, Consulting Chemist for the Telegraph Company, was delegated to make a study of this problem. His preliminary survey developed the following requirements:

(1) An inexpensive, simple metal treatment, needing a minimum of equipment and time, and employing unskilled labor with a minimum of supervision.

(2) A treatment that would be rust-resisting until the application of the final protective coating.

(3) A treatment that would provide an excellent bond between the metal and the protective coating.

As a result of the investigation carried out by Dr. Curtin there was developed a metal treatment that is said to be simple to handle, inexpensive and positive in its action. The ingredients consist of a powder and a solvent used in water at a temperature of approximately 150° F. This metal treatment has recently been made available to the trade under the name of Loxal.

The actual treatment consists of dipping the metal parts to be treated into the Loxal solution. About 10 ounces of Loxal Powder and 3 ounces of Loxal Solvent per gallon of water are dissolved in an iron tank. The parts to be treated are introduced into this solution in perforated iron baskets, on racks or by conveyors or trays, and are held in this solution for a period of from one to five minutes and are then given a quick rinse in hot water, after which they are dried in open air or a warm air blast.

Little preparation is needed before treatment. Removing oil or grease and sometimes a brief pickling treatment, followed by rinsing in hot water usually suffices.

The equipment required is inexpensive and it is stated, requires practically no maintenance. A metal tank of requisite size, fitted with steam coils to heat the solution to 150°F. and with facilities for filling with water and for handling the material to be treated, is all that is necessary.

Advantages Claimed

When metals are coated with Loxal, such parts may be stored without danger of rusting, until the manufacturer finds it convenient to apply the finish.

Loxal coating also acts as a bonding coat, presenting a uniform surface, free from blemishes, to which the finishing coat of paint, lacquer or enamel tenaciously adheres.

Should any part of the base metal become exposed through a scratch or a break, Loxal coating will inhibit the spread of rust.

Loxal is applicable to practically all types of iron and steel surfaces. The carbon content of the steel has no appreciable effect in retarding the formation of the Loxal coat, and excellent results have been obtained on steel objects which have been spot-welded or which carry an oxidized film on the metal surface. The same desirable Loxal coat can be formed on cadmium, zinc, and certain other non-ferrous metals.

Loxal gives, it is stated, a great coverage per pound of material and there is no appreciable loss as a result of precipitated sludge in the work-tank, since the addition of Loxal Solvent to the bath converts any sludge into a clear solution which automatically becomes the active coating ingredient. A further economy is that iron equipment is not harmed by Loxal, and there is no danger of leaks occurring in iron tanks. No chemical incrustation forms on the heating coils, whether made of iron or brass.

The Western Union Telegraph Company has made this process available to the metal industry through Curtin-Howe Corporation 405 Lexington Ave., New York.

Induction Drying Ovens

A new type of oven for drying paint, enamel and lacquer, has been developed by the Ajax Electrothermic Corporation, Trenton, N. J. This oven is based on the same principle as the melting furnaces made by this company, namely, electric heat by induction.

The metal parts are heated by induction as they pass through the oven. Therefore the evaporation of the volatile matter in the paint is from the layers next to the metal outward. This, it is stated, prevents case hardening and subsequent wrinkling of the finish. The drying time is said to be shortened, especially when the pieces to be baked are heavy, because the metal parts are heated in a short time by induction to the correct temperature, and then held at this temperature long enough to permit the volatile matter to be driven off.

Practice has shown that any number of coats which can be laid on the work without sagging, can be dried at one time.

A number of additional advantages are claimed for the induction type drying oven. Ventilation losses are at a minimum; radiation is reduced to minimum; practically all of the electric energy supplied to the oven is put to work, and only a very small fraction is lost. Fire and explosion risk is eliminated and the work is the hottest part of the entire system. There are no products of combustion to remove or to attack the work. These ovens are in operation to-day for drying paint on wheels, fenders, radiator shells, lamps, tire covers, motor blocks and other parts as well as drying moisture from bodies. Two of the important plants using them are The Chrysler Corporation, and the Edward G. Budd Manufacturing Company.

Polishing Cement

A polishing wheel cement is being manufactured by the M. P. Iding Disc Grinding Compound Company, 3739 N. 26th Street, Milwaukee, Wis. E. R. Butler, 328 Hausberry Street, Philadelphia, is Eastern Representative. This cement is intended to replace glue for holding the abrasive particles on polishing wheels and to eliminate some of the disadvantages and hazards of glue maintenance.

Iding's polishing wheel cement is furnished in one uniform grade prepared for immediate use and having a liquid bond that can be used to regulate the density to conform with the sizes of abrasives and work to be polished. It is said to be practically odorless and not to lose its strength even though exposed indefinitely. It is furnished in air tight containers from which it is used directly, thus cutting evaporation loss. It makes unnecessary the cleaning of utensils after using, and the control instruments used with glue containers. It eliminates glazing and makes the application of pumice stone unnecessary.

Nickel Brightener

A compound to be used as an addition agent to nickel solutions is being sold by the Lea Manufacturing Company, Waterbury, Conn. This material, it is stated, results in a brighter, more lustrous finish at lower cost, and eliminates color buffing on small articles. Full instructions are given with each initial shipment.

New Tumbling Mills

The W. W. Sly Manufacturing Company, Cleveland, Ohio, has developed a new line of tumbling mills for castings described in their Bulletin S-73.

The design of these mills is said to be a radical departure in many details from their previous design of tumbling mill so that these new tumbling mills present modern construction in every respect.

The particular features are that these mills are equipped with roller bearings throughout; an improved mill barrel construction for longer life and to prevent warpage under severe duty; modern drives are represented by worm gear speed reducers. Another special feature with which these mills can be supplied is a combination clutch and brake, the clutch for starting and stopping the mill, the brake, applied by the clutch lever, to stop and hold the mill in any desired position for most convenient loading and unloading. The door lock is also a new feature, its operation is quick and simple, no parts are actually removed from the mill.

The standardization of these mills includes various arrangements as single mills, for belt drive or direct motor drive, mills arranged in single file or double file batteries, mills on elevated platforms or depressed below the floor.

This company has manufactured tumbling mills for sixty years, inventing and introducing the first exhaust tumbling mill many years ago, with Sly Cloth Type Dust Collector, first brought on the market in 1897.

Felt Bonded Metal

Felt Bonded Metal, offered jointly by H. H. Robertson Company of Pittsburgh, Pa., and The Felters Company of Boston, Mass., is produced by a method covered by patent which produces a permanent bond between Felt and metal. In the process a metal coating is fused between the layer of felt and the metal so that the fibres of the felt are embedded in the metal coating and there is an actual complete bond which will not separate under heat, cold, moisture, fumes, or mechanical friction, strain, or distortion.

The application of felt may be to one or both sides of the metal. The thickness of the felt may be varied to suit requirements, as can also the weight of the sheet metal. After the felt is applied, the metal can be bent or shaped without breaking the felt contact.

The uses of this material appear to be almost unlimited; as, for example, it is now undergoing tests in several research laboratories for air conditioning equipment. The felt lining provides sound deadening and also provides felt to metal contact at all joints, thereby eliminating both leakage and vibration noises. Experimental work is now being done on this material in connection with the building of automobile bodies, airplane fusilage, metal shanks for shoes, bases for telephone instruments, office appliances, and precision instruments. All properties of felt are retained in the process. Felt Bonded Metal may be finished with Bakelite, lacquer, or in plywood.

Equipment and Supply Catalogs

101 Uses for the Air Acetylene Flame. Linde Air Products Company, New York. (165)

Maintenance of Reciprocating Parts. How to rebuild pistons, bullrings, valves and similar units by bronze welding. Linde Air Products Company, New York. (166)

Research Microscopes and Accessory Equipment. Bausch and Lomb Optical Company, Rochester, N. Y. (167)

Bakelite Varnish, Enamel, Lacquer and Cement of the Baking Type. Bakelite Corporation, New York. This booklet deals with four classes of Bakelite products, varnish, enamel, lacquer and cement. It describes their properties, uses, storage and methods of application. (168)

Worthington Centrifugal Pumps. Types C, CA, and CB. Worthington Pump and Machinery Corporation, Harrison, N. J. (169)

Chipping and Dust Goggles. Chicago Eye Shield Company, Chicago, Ill. (170)

Salary Standardization and Administration. Policyholders Service Bureau, Metropolitan Life Insurance Company, New York. (171)

It Begins with Cost and It Ends With Cost. A broadside from the Pangborn Corporation, Hagerstown, Md. on blast cleaning barrels. (172)

Manual of Welding and Fabricating Procedure for IngAclad Stainless Clad Steel. Ingersoll Steel and Disc Company, 310 S. Michigan Avenue, Chicago, Ill. (173)

14 Points of Superiority. A broadside on a new all-metal cloth screen dust collector. Pangborn Corporation, Hagerstown, M. D. (174)

Private Initiative Versus Planned Economy. No. 7 in a series of booklet editorials by Allen W. Rucker in collaboration with N. W. Pickering, president of the Farrel-Birmingham Company, Ansonia, Conn. (175)

Solving Industrial Crimes. Case No. 3. A description of a solution of trouble in industry by graphic instruments. The Esterline-Angus Company, Indianapolis, Ind. (176)

Centrifugal Pumps for Acids and Alkalies. A bulletin covering a new series of pumps by the Duriron Company, Inc., Dayton, Ohio. (177)

A New Line of Cold Headers. An announcement from the National Machinery Company, Tiffin, Ohio. (178)

Tube Couplings and Associated Equipment. Bulletin No. 37. Price-list. Parker Appliance Company, Cleveland, Ohio. (179)

Tube Fabrication. Bulletin No. 28, on flaring tools, benders, and tube fabrication. Parker Appliance Company, Cleveland, Ohio. (180)

Magnusol. Illustrated page and data sheet concerning the properties of a new cleaner. Magnus Chemical Co., Inc., Garwood, N. J. (181)

Brass Die Castings with the Strength of Steel. A description of Brastil die castings, a copper base alloy cast in steel dies. Doehler Die Casting Company, Toledo, Ohio. (182)

Electric Drills, Grinders, Buffing and Polishing Machines. Catalog No. 37. Standard Electrical Tool Company, 1938 West 8th St., Cincinnati, O. (183)

Bakelite Review. A periodical digest of Bakelite achievements. Bakelite Corporation, 247 Park Avenue, New York. (184)

Anti-Friction Bearings. Engineering Section. Bantam Ball Bearing Company, South Bend, Ind. (185)

The Secret of Paul Revere. A booklet on the life, work and philosophies of Paul Revere, artisan, industrialist and philosopher. Revere Copper and Brass, Inc., 2200 North Natchez Ave., Chicago, Ill. (186)

Automatic Pump Controller for Elevated Tank Systems. Minneapolis-Honeywell Regulator Company, Minneapolis, Minn. (187)

Save time. Use the coupon below to get any of the above catalogs or bulletins, or for data on any subject not mentioned this month. METAL INDUSTRY will see that you get them promptly.

METAL INDUSTRY
116 John Street, New York.

(Insert below the number in parentheses at end of each item desired.)

I wish to receive the following bulletins mentioned in August .....

.....

I want information on the following equipment or materials also: .....

.....

Associations and Societies

American Electro-Platers' Society
Philadelphia Branch

The Philadelphia Branch held its regular meeting on Friday night, June 22nd at the Harrison Laboratory, U. of P., and a fairly good attendance was present even though the thermometer was at 90.

Two new members were elected and then Delegates Gehling and Underwood read their report of the Detroit convention which was very interesting. It is also well to note here that the Philadelphia Branch's secretary Joseph Underwood was elected First Vice President of the Supreme Society. It is also traditional that when a member of the Philadelphia Branch is elected to an executive office of the Supreme Society everything seems to get started and going in the Branch, and the same is again proving true this year. After a lapse of three years the members have decided to have a Yearly Meeting and Banquet, which will be held the Saturday before Thanksgiving, (November 24) at ADAMS, Spring Garden and 13th Sts. This should be a grand reunion of the members and their friends after all everyone has passed through during the past few years.

The Philadelphia Branch Electro-Platers Class just closed a successful school year with a class dinner and the presentation of a book to Albert Hirsch the teacher. The class had twenty-seven members, all interested in trade expansion work, and the class had an average attendance of 78% for the school year. The subjects covered by the class this year were:

Chemistry: Laws of Chemical Combination; Atomic Hypothesis; Chemical Formulae and Nomenclature; Chemical Equations and Chemical Action.

Ionic Theory: Acids; Bases; Neutralization; Equivalent Weights; Normal Solutions; Solution Conductivity; Volumetric Analyses of Nickel, Cyanide Copper and Chromic Acid Solutions.

Electricity: Potential and Difference of Potential; Resistance and Conductance; Resistivity of Metals and Alloys; Ohm's Law.

Electrolysis: Faraday's Laws; Electrochemical Equivalents; Measurement of Anode and Cathode Efficiencies; Resistivity; Throwing Power and Thickness of Deposit.

Potentiometric Determination of pH.

Mathematics: Logarithms and Their Use in Calculation of pH Work; Graphical Representation of Results Obtained.

In the past four years we have been conducting an elementary course in chemical analysis for electroplaters and electrotypers. Members of the class have obtained laboratory practise in volumetric analysis, and have learned to analyze fifteen or more different plating solutions. Al Hirsch, says that this year we are prepared to take up the electrochemistry of plating. Therefore, we are giving a lecture course with demonstrations in electrochemistry as applied to electroplating and electrotyping. This course will be given every Monday evening for a two hour period. Those desiring, may have two extra evenings each week in the laboratory. The regular electroplating and analytic course will be given two evenings a week, two hours each night. (Tuesday and Wednesday evenings.) Please note that these courses are prepared for adult education and the lectures are so simplified that no previous training is necessary.

Albert Hirsch, our teacher is an active member of the Philadelphia Branch, A. E. S., a graduate of the school of Arts and Science, Temple University in chemistry and a member of the faculty of the Jules Mastbaum Evening Vocational School.

Registration will be on September

17th, 1934, at the Jules Mastbaum Evening Vocational School, (Room 310), Frankford Ave. and Clementine St., Phila., Pa. The cost of tuition is $1.00 per school year, and it is returnable to all those attending 75% of the sessions. From the foregoing and what we can see is taking place in the industrial world today, it behooves every foreman plater to join this class and also to see to it that his assistant also joins.

The next meeting of the branch will be held at the Harrison Laboratory, U. of P., 34th and Spruce Sts., Phila., on Friday, September 21st.

George Gehling, Librarian.

New York Branch

A regular meeting was held on Friday, July 13th, of all days. Despite the fear of the superstitious nothing unusual happened. In line with the professed efforts of the officers to start meetings early, considerable business was covered and we were into Good and Welfare before nine o'clock.

There were plenty of lively discusions on a variety of subjects. Quite interesting remarks were made on rhodium plating procedure, and questions were answered by Mr. Henry, who is considered an authority on rhodium plating technique of high grade work.

Our esteemed president, John Rolfe, asked for the procedure in preparing small pieces of pure lead before nickel plating. Preparation of this work, as outlined, would make this an unprofitable job, unless requirements were changed. Questions such as this particular one, prove the true worth of membership in the A. E. S., for, though a particular plating job is possible as most are, all are not profitable or practical, particularly for large lots.

Frank MacStoker and John Rolfe visited our good friend and brother, Phil Moringstar, and were pleased to announce that he has quite recovered from his recent illness, and has returned to work after a prolonged absence.

It is with deep regret that the members were informed of the severe illness of Martin B. Apy. Mr. Apy, who is past president of Electrotypers Union No. 100 and at present, Secretary of the local executive board and a member of the International Executive Board, collapsed while attending the International Electrotypers and Stereotypers Convention, at Detroit and it was necessary for him to return home. The Branch and members wish Mr. Apy a speedy recovery, and sincerely hope that he will be with us soon again.

Arthur Wallace (Rec. Secretary).

British Institute of Metals

The annual autumn meeting of the British Institute of Metals will be held in Manchester, England, September 3-6, under the chairmanship of **Dr. Harold Moore.** The proceedings will begin on the evening of September 3rd with the Autumn Lecture by **Dr. J. L. Haughton** on **"The Work of Walter Rosenhain,"** who died recently. **Dr. Rosenhain** was a past president of the Institute and a world-famous metallurgist.

The following papers will be read:—

HOAR, T. P.: "The Corrosion of Tin and Its Alloys. Part I.—The Tin-Rich Tin-Antimony-Copper Alloys."

QUINNEY, H.: "Some (Magnetic) Properties of Heavily Cold-Worked Nickel."

SUTTON, H., and W. J. TAYLOR: "The Influence of Pickling on the Fatigue-Strength of Duralumin."

KENWORTHY, L., and J. M. WALDRAM: "A Reflectivity Method for Measuring the Tarnishing of Highly-Polished Metals."

ALKINS, W. E., and W. CARTWRIGHT: "Experiments in Wire-Drawing. Part IV.—Annealing of H.-C. Copper Wires of Varying Hardness—Elongation Values."

FARNHAM, G. S., and HUGH O'NEILL: "Crystal Re-Orientation on Heating Drawn Copper Wires."

OWEN, Professor E. A., and LLEWELYN PICKUP: "The Crystl Densities of Industrial Brasses from X-Ray Data."

MACNAUGHTON, D. J.: "The Improvement of White Bearing Metals for Severe Service: Some General Considerations."

KENNEFORD, A. S., and HUGH O'NEILL: "The Behaviour of White Bearing Metals when Subjected to Various Deformation Tests. Part I.—Indentation Tests." With an Appendix on "An X-Ray Examination of Babbitt Metal and of the Age-Hardening of Cast Lead-Alkali Alloy."

ARROWSMITH, R.: "The Behaviour of White Bearing Metals when Subjected to Various Deformation Tests. Part II.—Tensile Tests."

GREENWOOD, H.: "The Behaviour of White Bearing Metals when Subjected to Various Deformation Tests. Part III.—Pounding Tests."

HANSON, Professor D., E. J. SANDFORD, and H. STEVENS: "Some Properties of Tin Containing Small Amounts of Silver, Iron, Nickel or Copper."

COOK, MAURICE, and EUSTACE C. LARKE: "Elongation Values of Copper and Copper-Rich Alloys."

SAMANS, CARL H.: "Deformation Lines in Alpha Brass."

MILBOURN, M.: "The Spectrographic Detection and Estimation of Minute Quantities of Impurities in Copper."

van SOMEREN, ERNEST H. S.: "The Spectrographic Analysis of Some Alloys of Aluminum."

SMITH, D. M.: "A Synthetic Spectrum Method of Analysis and Its Applications to the Quantitative Estimation of Small Quantities of Bismuth in Copper."

WILLIMOTT, STANLEY G.: "A Note on Some Ancient Copper-Coated Silver Coins of Cyprus."

Non-Ferrous Foundrymen's Association

The Non-Ferrous Foundrymen's Association for Industrial Recovery will hold its first annual meeting at the Bismarck Hotel, Chicago, Ill., September 19-20. Sessions will be held on the following subjects:

1. Proposed standard cost estimating and accounting system.
2. Proposed standard trade customs.
3. Proposed standard classifications of castings as to weight and intracacy.
4. Proposed standard terms of payment.
5. Open discussion of various provisions of the code.
6. Election of officers for the coming year.

Full details can be obtained from Sam Tour, executive secretary, 47 Fulton Street, New York City.

American Foundrymen's Association

The Nominating Committee for 1934 met at Atlantic City, June 28th, and nominated the following officers and directors:

For **President,** to serve for one year:

D. M. Avey, Editor, "The Foundry," Cleveland.

For **Vice-President** to serve for one year:

B. H. Johnson, Assistant to the President, R. D. Wood and Company.

For **Directors** to serve three-year terms each:

Frank J. Lanahan, President, Fort Pitt Malleable Iron Company, Pittsburgh, Pa.

A. E. Harrison, General Supt. of Foundries and Pattern Shop, Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

E. W. Campion, Assistant Supt. Buckeye Steel Castings Company, Columbus, Ohio.

Sam Tour, Vice President, Lucius Pitkin, Inc., New York.

E. O. Beardsley, President, Beardsley & Piper Company, Chicago.

Society of Chemical Industry

The American Section of the Society of Chemical Industry announces the election of the following officers to serve for the year ending June 1, 1935:

Chairman: Robert J. Moore; Vice Chairman: W. D. Turner; Hon. Secretary: Foster D. Snell; Hon. Treasurer: J. W. H. Randall.

In addition, five new members were elected to the Executive Committee to take the place of retiring members. Those newly elected are Lincoln T. Work, Wallace P. Cohoe, Albert E. Marshall, James G. Vail and Charles A. Lunn.

Headquarters are at 305 Washington Street, Brooklyn, N. Y.

Personals

Paul D. Merica

Dr. Paul D. Merica, Assistant to the President, International Nickel Company, was recently awarded the honorary degree of Doctor of Science by De Pauw University.

Dr. Merica Metallurgist, is a Hoosier, having been born in Warsaw, Indiana, March 17, 1889, the son of Charles Oliver Merica (1863-1918), a clergyman and educator and President of the University of Wyoming from 1908 to 1913, and Alice (White) Merica.

He was educated in the schools of his native State, in DePauw University (1904-1907), and at the University of Wisconsin from which he was graduated A.B. in 1908. After spending a year in post graduate work in the Department of Physics at the University of Wisconsin, he then (being not yet 20 years old) went to China, where he was Professor of Chemistry in Chekiang Provincial College, Hangchow, until 1911. He then went to Germany to study and was fortunate enough to receive his Ph.D. from the University of Berlin just a few months before the outbreak of the World War in 1914. Returning to America, his first position was as special investigator at the Engineering Experiment Station at the University of Illinois, but before the year was out he joined

DR. P. D. MERICA

the staff of the U. S. Bureau of Standards as associate physicist, where he was actively connected as Physicist and Metallurgist until 1919. Since then he has been associated with The International Nickel Company, first at Bayonne, N. J., as Physical Metallurgist, and later as Superintendent of Research, Director of Research after 1922, Assistant Manager of Development and Research and Assistant to the President, at the New York Office of the Company.

Doctor Merica was married to Florence Young in 1917.

He has written or collaborated in numerous important papers on metallurgical subjects, several of the more significant issued by the Bureau of Standards, others by leading technical publications, or the Transactions of scientific societies. Among these may be mentioned: "Copper-Aluminum Alloys," 1913; "Initial Stresses in Wrought Brasses," 1917; "Copper," a compilation and discussion, 1918; "Initial Stress in Corrosion Cracking," 1918; "Aluminum and Its Light Alloys," 1918; "Heat-treatment of Duralumin," 1918; "Light Aluminum Casting Alloys," 1919; "Behaviour of Wrought Manganese Bronze," 1919; "Constitution and Metallography of Aluminum," 1919; "Solders for Aluminum," 1919; "Properties of Hot-rolled Monel Metal," 1921; "Nickel," compilation and discussion, 1921; "Welding Monel Metal," 1922; "Malleability and Metallography of Nickel," 1925; "Nickel Industry," 1926; "Physical and Mechanical Properties of Nickel," National Metals Handbook; Material on the alloy cast irons as contributions to handbooks, pamphlets, journals and in the form of technical data sheets.

Doctor Merica is a member of many technical associations, among which are:

American Institute of Mining and Metallurgical Engineers, Vice-President and Director, Finance Committee of Board, Chairman of Institute of Metals Division 1926-7.

American Society for Testing Materials. Was Secretary for many years of Committee on Non-ferrous Metals and Director of the Society, as well as member of its Joint Advisory Committee on Corrosion and its Joint Research Committee.

Electrochemical Society, Vice-President 1926-7.

Institute of Metals (England), since 1921.

Iron and Steel Institute (England), since 1921.

American Chemical Society

American Institute of Chemical Engineers

American Society for Metals

Metallurgical Advisory Committee of Bureau of Standards

Canadian Institute of Mining and Metallurgy

Deutsche Gesellschaft fur Metallkunde

Director of Industrial Research

American Physical Society

Washington Academy of Sciences

Advisory Committee to Department of Mining and Metallurgy of Massachusetts Institute of Technology

American Foundrymen's Association Advisory Committee of Non-ferrous Division.

In February, 1929, the James Douglas Medal of the American Institute of Mining and Metallurgical Engineers was conferred on Doctor Merica in recognition of his distinguished services in the field of non-ferrous metallurgy.

He is a member of the Engineers' Club, New York; and of the City Midday Club, New York.

Biographies are to be found in Who's Who in Engineering, Who's Who in America, Who's Who in the East, National Cyclopedia of American Biography.

J. R. Bateman has been added to the sales staff of the Bunting Brass & Bronze Company, Toledo, with headquarters in Chicago. He will cover Illinois, Wisconsin, Missouri, Iowa and Kansas. **J. F. Roberts** has been appointed manager of the Bunting branch at Dallas, Tex., **R. H. Roberts,** manager of the Kansas City branch, and **F. W. Roberts,** manager of the office serving Metropolitan New York.

John C. Hopkins has been appointed district sales manager of the Cleveland office of General Refractories Company, Philadelphia, Pa. He was formerly associated with the Central Furnace Division of the American Steel and Wire Company, Cleveland, Ohio. Mr. Hopkins' new headquarters are in the Leader Building, Cleveland. **James P. Raugh** is associated with the same office.

Dr. J. S. Long, Professor of Chemistry at Lehigh University and Consultant Chemist for the Armstrong Cork Company, the New Jersey Zinc Company, the Archer-Daniels Midland Company, etc., has resigned these positions to become Chemical Director of **Devoe and Raynolds Company** and Subsidiaries.

Obituaries

William H. Bassett

William H. Bassett, metallurgical manager of the American Brass Company, and recently elected president of the American Society for Testing Materials died suddenly at his home in Cheshire, Conn., July 21st, at the age of 66. Death was caused by embolism.

Mr. Bassett was a pioneer metallurgist in the brass industry and world famous for his application of scientific principles to practical mill operations. He was born in New Bedford, Mass., the son of William A. and Almira D. (Mayhew) Bassett. He graduated from the Massachusetts Institute of Technology in 1891. After several years as a chemist and then superintendent for the Popes Island Manufacturing Company, he taught chemistry at the Swain Free School until 1900, when he was appointed chief chemist of the Newark

works of the New Jersey Zinc Company. In 1902 he became chemist for the Coe Brass Manufacturing Company. When the American Brass Company was formed, he was made chief chemist and metallurgist in Waterbury. In 1912 he was promoted to the post of technical superintendent and in 1930 was made metallurgical manager.

WILLIAM H. BASSETT

His great contributions to the brass industry were improvements in chemical analysis of copper base alloys and the application of laboratory control through the use of the microscope and the spectroscope to manufacturing operations. He was very active in the preparation of the standard specifications for non-ferrous metals, their alloys and their products. His fame was world-wide.

Mr. Bassett was influential in a number of technical and scientific societies. He was a director and past president of the American Institute of Mining and Metallurgical Engineers. At the time of his death, he was president of the American Society for Testing Materials. He was a member of the American Institute of Chemical Engineers, the Society of Automotive Engineers, the British Institute of Metals, the Society of the Chemical Industry and the Franklin Institute and a number of others. He was a member of the Chemists Club, and the Engineers Club of New York. He leaves a widow, Mrs. Sarah Whiting Bassett, a son, William H. Bassett, Jr., and a daughter, Alice Whiting Bassett.

The brass industry has lost its outstanding technical man.

Valentine Seeger

Valentine Seeger, founder of the Toledo Brass and Iron Works, 19 St. Clair Street, Toledo, Ohio, died on July 7th, at the age of 79. He had been ill for several months.

Mr. Seeger was born in Germany in 1855. At the age of sixteen he left for America, going directly to Toledo. After ten years he went in the brass foundry business and was the sole owner of the above named company ever since. He had the reputation of always "sailing his own ship", never having cheated anyone out of a cent, and conducting the business honorably and soundly for fifty-three years.

The Toledo Brass and Iron Company continues under the management of his two sons, Valentine Seeger, Jr., and Charles Seeger, with his daughter Margaret Seeger as office manager.

Industrial and Financial News

News of the Codes in The Metal Industries

Copper

George W. Farny, a mining engineer, has been named Administration Member of the Copper Code Authority, representing the Government.

The Copper Code Authority has published lists of copper consumers, who have signed temporary agreements to use only Blue Eagle Copper. This list now includes over 85 per cent of the consumption of copper in the U. S.

American Brass Co.
American Electrical Works
American Manganese Bronze Company.
American Sterilizer Co.
American Tube Works
Anaconda Wire & Cable Co.
Ansonia Electrical Co.
Ajax Metal Company
Baer Brothers.
Baldwin Locomotive Works.
Belmont Smelting & Refining Works.
Bridgeport Brass Co.
Bridgeport Rolling Mills Co.
Bristol Brass Corp.
Buffalo Meter Company
A. W. Cadman Mfg. Co.
Chase Brass & Copper Co., Cleveland, O.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chase Companies, Inc.
Chicago Extruded Metals Co.
Cincinnati Railway Supply Co.
Copperweld Steel Co.
Crane Company
Crescent Insulated Wire & Cable Company
Dill Manufacturing Co.
The Electric Auto-Lite Company
Electrical Materials Co.
Fitz, Dana & Brown.
Frontier Bronze Corporation
General Cable Corp.
General Electric Co.
Gilby Wire Co.
C. A. Goldsmith Co.
Hanson-Van Winkle-Munning Co.
Hudson Wire Co.
C. G. Hussey & Co.
International Silver Co.
Charles Lennig & Co., Inc.
Magnus Company, Inc.
Martin Sales & Supply Co.
Metals & Insulation Co. of America
Mueller Brass Co.
National Bearing Metals Corp.
National Brass & Copper Co.
National Electrical Products Corp.
Nehring Electrical Works.
Neptune Meter Company
New England Brass Co.
New Haven Copper Co.
Okonite Callender Cable Company
Otis Elevator Co.
Pemberthy Injector Company.
Phelps Dodge Copper Products Co.
Phosphor Bronze Smelting Co.
Plume & Atwood Mfg. Co.
Revere Copper and Brass, Inc.
John A. Roebling's Sons Co.
Sandusky Fdy. & Machine Co.
Scovill Manufacturing Co.
Seymour Manufacturing Company
Shenango Penn Mold Co.
Spargo Wire Company
Sperry Gyroscope Co., Inc.
Thinsheet Metals Company
Nathan Trotter & Co.
United States Steel Corp.
Waterbury Rolling Mills, Inc.
Weatherhead Co.
Western Cartridge Company
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Wolverine Tube Company
Worthington Pump & Mach. Corp.

The Copper Code Authority is compiling statistics on the stocks of unsold copper in the hands of refiners and fabricators, in order to obtain a true picture of the condition of copper stocks.

Brass Forgings

The Code of Fair Competition for the Brass Forging Manufacturing Industry was approved and became effective July 29th. Trade practice provisions. (1) uniform cost accounting; (2) open prices.

Metal Sign and Display Manufacturing

The following were approved as members of the Code Authority of the Advertising Metal Sign and Display Manufacturing industry: **Leo M. Grace,** Grace Sign and Manufacturing Company, St. Louis, Mo.; **Harry G. Evitt,** Parker Metal Decorating Company, Baltimore, Md.; **Charles R. Fredericksson,** American Art Works, Coshocton, Ohio; **Merlin G. Robertson,** W. F. Robertson Steel and Iron Company, Springfield, Ohio; **Arch M. Donaldson,** Donaldson Art Sign Company, Covington, Ky.; **George H. Coulter,** Massillon-Cleveland-Akron Sign Company, Massillon, Ohio; and **W. B. Gormany,** American Can Company, Maywood, Ill.

Vitreous Enamelware

The Code of Fair Competition for the Vitreous Enamelware Manufacturing Industry, division of the Fabricated Metal Products Industry, was approved and became effective on August 1st. Maximum hours, 40; minimum wages, 30-40c; trade practice provisions (1) open prices, (2) prohibiting selling below reasonable cost.

Metal Etching

The Code of Fair Competition for the Metal Etching Industry was signed June 4, 1934; effective date, June 14, 1934. Working hours, 40; minimum wages, 34-40c per hour. Trade practice provisions cover uniform cost accounting; selling schedules; prohibit guarantee against price decline.

Job Galvanizing

The National Recovery Administration announced approval of the method of selection and recognition of the personnel of code authority for the job galvanizing metal coating industry.

The metal coating code authority is as follows: **T. M. Gregory,** Hanlon-Gregory Co., 5515 Butler St., Pittsburgh, Pa.; **A. J. Blaeser,** Joslyn Mfg. & Supply Co., Chicago, Ill.; **E. K. Cooley,** San Francisco Galv. Co., San Francisco, Cal.; **G. H. Koven,** L. O. Koven Bros., Jersey City, N. J.; **F. P. Auxer,** National Telephone & Supply Co., Cleveland, O.; **C. S. Whitney,** Dover Stamping & Mfg. Co., Cambridge, Mass., and **J. P. Cattie,** Jos. P. Cattie Bros., Philadelphia, Pa.

Aluminum Code

The Code of the Aluminum Industry was approved by Administrator Johnson for a trial period of 90 days, on June 26, 1934. The Code is effective July 11.

Maximum hours 40; minimum wages 30c to 35c. Special trade practice provisions: (1) prohibiting discrimination by producers of aluminum ingot against any customers in comparison with each other or with themselves; in other words, prices charged must be uniform; (2) no special allowances, secret rebates, etc., in dealings with subsidiary or controlled companies.

Aluminum Code Authority, Inc., has been organized and consists of the following members:

President, George A. Ginsberg, U. S. Smelting and Aluminum Company, New Haven, Conn.

Vice-President, S. J. Simmons, Aluminum Company of America.

Secretary - Treasurer, Donald McRonald.

The members are:

Secondary Aluminum—Walter M. Weil of Aluminum Research Institute.

Extruded Shapes—Harry W. Holt, Bohn Aluminum & Brass Company, Detroit, Mich.

Forgings—S. J. Simmons, Aluminum Company of America.

Tubing, etc.—George J. Stanley of Aluminum Company of America.

Sheet Aluminum—R. G. Farrell of Fairmont Aluminum Company, Fairmont, W. Va.

Bauxite—Theodore Wenzel of Chas. Lennig Company, Philadelphia.

Virgin Aluminum—W. C. Nielson, Aluminum Company of America.

Aluminum Foil—R. G. McKay, Reynolds Metal Company, N. Y. City.

Aluminum Pistons—H. J. Hater, Aluminum Industries, Inc., Cincinnati.

Aluminum Bronze Powder—I. W. Wilson, of Aluminum Company of America.

Aluminum Ore Concentrates—George A. Ginsberg, of United Smelting & Aluminum Company, New Haven, Connecticut.

Metal Developments

August Hechscher, chairman of the Mining and Development Corporation, in a letter to Congressman Caldwell, urged reciprocal trade agreement with Bolivia providing for shipment of tin concentrates direct to the United States, and the establishment of a tin smelting industry in this country.

A battery of 36 aluminum reflectors carried the glow of 2000 watt movie floodlights to create daylight while the huge balloon was being inflated for the flight into the stratosphere by **Major William Kepner** and **Captain A. W. Stevens.** The flight started from a natural amphitheatre in the Black Hills near Rapid City, So. Dakota. The balloon was made of a magnesium alloy.

Italy is forging ahead in aluminum production and ranked sixth among the world producers in 1932, when they produced 13,400 metric tons out of a total world production of 153,800 tons.

An interesting communication from **Henry Weitz,** president of the **Carlton-Cook Plating Corporation,** New York, comments on the fact that "there has been no progress in the art of polishing metal products in place in the last 3,000 years. It takes just as much elbow grease to polish a piece of brass now as it did thousands of years ago." Mr. Weitz recommends chromium plating to eliminate the use of elbow grease.

The **British Department of Scientific and Industrial Research** has just issued a report, giving examples, of the manner in which the inner structure of many materials can be revealed by x-ray crystal analysis. This method can be used for studying the crystal structure of a wide variety of substances, such as metals, paints, electro-deposits, scale on boiler tubes and a number of others.

Aluminum, Ltd., London, England, has patented a process for improving aluminum alloys which contain 2 to 12% copper, 0.005 to 0.1% tin and no magnesium. An artificial aging process is used, being carried on between 100 and 200 degrees Centigrade, preferably after the alloy has been heat treated. Impurities are limited rigidly.

The **British Non-Ferrous Metals Research Association** has just issued its 14th annual report, showing an expenditure for 1933 of almost $110,000 on 15 research projects. Among these researches are the elimination of bismuth from copper in fire refining; the effect of impurities on the mechanical and rolling properties of non-ferrous metals and optical methods of determining the amounts of these impurities; methods for the prevention of porosity in electroplated coatings; improvement in the soundness of automobile pistons and crankcases for aircraft by the removal of dissolved gases in aluminum; the effect of various types of water on the zinc coating in hot water illustrations; new lead alloys for cable sheathing a study of tarnish on polished metal surfaces, etc.

In a recent inspection the Cunard liner, **Mauretania,** was found to be fit to stay at sea, being sound and in good condition. It is interesting to note that all the windows of the public rooms had brass casements. When the paint was removed from these casements, it was found that "the brass was in condition to last a century," according to Captain Peel.

Three of the interesting exhibits at the **Century of Progress Exposition in Chicago,** feature aluminum, copper and brass. The Aluminum Company of America will show a melting furnace and die casting equipment for engine heads. The Anaconda Copper Company will have a model showing the electrolysis of copper and a model electrolytic tank. The American Brass Company will have a rolling mill with a capacity for 20,000 pounds of brass per day, and a sheet slitting machine. (See The **Metal Industry,** July, 1934, page 243).

Following the general pattern of its important exhibition of 1929, the **Metropolitan Museum of Art,** New York, will offer during November and December, 1934, a comprehensive display of contemporary American industrial art. This will be the thirteenth in the series of industrial art exhibitions and will mark the progress of design over a five-year period, notably in the field of home furnishings.

Aluminum mirrors, it is believed, will some day be developed to a point where they will take the place of such immense lenses as that recently cast in glass at Corning, N. Y., for a giant telescope.

Pewter manufacture has expanded lately, and the Worshipful Company of Pewterers at London, England, is seeking a new home Organized in 1473, the ancient guild had only two different headquarters until some years ago when it ceased activity due to the unpopularity of pewter. It will now resume its work as a modern trade association.

Aluminum. The largest aluminum works in Europe is being constructed by Soviet Russia at Kamensk, to be known as the Ural Aluminum Combine. It will cost over 200,000,000 rubles. Rich local deposits of bauxite will be used. At Kichkas, Soviet Russia, a new **magnesium** plant is being erected as another part of Russia's program for nonferrous industry.

Aluminum streamlined cars newly built for use on the B. M. T. subway in New York will be equipped with a three-tone chime which will warn against closing doors.

Brass continues to hold the public imagination. The Aida Brass Quartet led a parade in New York last month of 400 members of 16 creeds representing the World Fellowship of Faiths. "Brass and Parsimmons" is the title of a letter to the editor of the New York Herald Tribune, from a gentleman who remarks on the color and radiance of fruits and metals in the windows of New York shops.

Metals placed near microbes have a harmful effect on the organisms, it has been found by Soviet scientists. Similar effects were observed on seeds. Metals of higher atomic weight are said to have most effect.

Babbitt Metal Consumption

Statistics on sales of babbitt metal by manufacturers, who produce for sale and on consumption of babbitt metal by establishments which manufacture their own metal, based on data reported to the Bureau of the Census by 39 manufacturers, are presented in the table below. Of the establishments referred to 25 report sales only, nine (including several important railroad systems) report the consumption of their own production of metal, and five report both sales and consumption of metal produced by them. The establishments which report sales to the Bureau produce approximately 62% of the babbitt metal manufactured in the United States for sale, in pounds:

	Total production (a)	Sales (b)	Production for own use (c)
1934—			
Jan.	2,256,109	1,838,655	417,454
Feb.	2,147,399	1,715,984	431,415
Mar.	2,474,114	1,976,117	497,997
April	2,527,677	1,964,142	563,535
4 mos.	9,405,299	7,494,899	1,910,401
1933—			
Jan.	1,346,030	1,073,879	272,151
Feb.	1,177,917	917,932	259,985
Mar.	1,134,928	941,774	193,154
April	1,544,045	1,270,471	273,574
4 mos.	5,202,920	4,204,056	998,864

(a) By 39 reporting establishments.
(b) By 30 manufacturers who produce for sale, including five who also report consumption of their own metal.
(c) By 14 establishments which manufacture their own metal, including five which also produce for sale.

Farrel-Birmingham Sales Conference

During the week of June 25, 1934, the sales force of the Farrel-Birmingham Company, Inc., met at the company's offices at Ansonia, Conn., for the annual sales conference. Sales representatives were present from New York, New Jersey, Buffalo, Pittsburgh, Akron, Chicago and Los Angeles.

The conference opened on Monday, June 25th, with an address by President N. W. Pickering, in which he reviewed the business of the past year, the prospects for the ensuing year and discussed the NRA codes and their effects on sales.

The following sessions were devoted to discussions of the various products manufactured by the company, with particular relation to the sales problems involved; the latest developments were explained by the sales and engineering department heads, and an opportunity was afforded on Wednesday for an inspection of the machinery then being built in the shops.

During the week the men were entertained by golf, fishing and other diversions. A general golf tournament was held on Tuesday afternoon, followed by an informal dinner which was attended by thirty of the company's executives, engineers and salesmen.

Magnus Chemical Company Exhibit at the Recent Fair in Paris, France, Showing Clean-Tanks Heated by Gas, Electricity and Oil

Earnings of Companies

(Net profit unless followed by (L) which is loss.)	6 months 1934	6 months 1933
American Machine & Metals Company	$ 23,634	21,183(L)
Bridgeport Brass Company	313,429	83,110
Bohn Aluminum & Brass Company	1,138,019	609,904
International Silver Company (2nd quarter)	40,302(L)	50,330(L)
American Metal Company	214,194(L)	65,969(L)
Revere Copper & Brass, Inc.	968,576	224,390(L)
National Lead Company	2,066,753	1,698,352
General Cable Corporation	240,007(L)	1,588,467(L)
Reynolds Metal Company	966,572	573,627(L)
Federal Mogul Corporation	85,151	9,321
Savage Arms Corporation	65,029(L)	181,781(L)
Yale & Towne Mfg. Co.	62,265	189,417(L)

Business Items Verified

C. W. Piper, 2033 Maple Avenue, Norwood, Ohio, has been appointed sales representative for H. O. Swoboda, Inc., Pittsburgh, Pa., covering Southern Ohio and Eastern Indiana territory with their lines of Falcon continuous electric heat treating furnaces, Falcon electric immersion heaters and Falcon industrial heating equipments for specialized applications. Mr. Piper has had considerable experience in the industrial electric heating and industrial control fields.

C. D. Dallas, president of Revere Copper and Brass, Inc., announces the appointment of **C. A. Macfie** and **C. C. Felton** as vice presidents of the company, with offices at the executive headquarters in the New York Central Building, 230 Park Avenue, N. Y. Mr. Felton was formerly sales manager of Calumet and Necla Consolidated Copper Company.

Revere Copper and Brass, Inc., announce the opening of an office at 911-912 Rhodes-Haverty Building, Atlanta, Ga. **Walter W. Fitts** is in charge.

W. S. Hamnett and Company, Inc., 39 Broadway, New York, announces its appointment as exclusive selling agents

in the United States for S. A. Pour L'Industrie de L'Aluminium, Neuhausen, Switzerland, producers of Rising Sun brand ingot aluminum.

Louis Allis Company, Milwaukee, Wis., manufacturers of electric motors and similar equipment announces a change in the location and management of its Pittsburgh office. The company's office will be located at 537 Oliver Building and will be in charge of J. F. Rodgers.

Duriron Company, Dayton, Ohio, has started construction of an extension to its alloy steel foundry which doubles the size of the present plant. Additional electric induction furnaces will be installed for the production of Durimet and Durco alloy steels and other chromium-nickel alloys.

Daystrom Corporation, Olean, N. Y., has completed removal of its business and equipment from Jamestown, N. Y., to above city. The company has taken over the large plant of the defunct Olean Metal Cabinet Company. Operations are on a curtailed basis at present, according to Lloyd C. Dahmen, president, who said production will be gradually increased until full capacity is attained.

Knapp-Monarch Company, has removed its Belleville, Ill., factory to St. Louis, Mo. The new address is Bent Avenue and Potomac Street.

St. John X-Ray Service, Inc., 30-20 Thomson Avenue, Long Island City, N. Y., announce that their next training course on Metal Radiography will be conducted at that address during the week of October 8th.

Pack-Morin, Inc., consulting engineers have moved from 261 Fifth Avenue, to 267 Fifth Avenue, New York.

New Incorporations

Mueller Brass Company, Port Huron, Mich., a Michigan corporation, organized March 15, 1927, as successor to **Mueller Metals Company,** to manufacture brass and copper products, plans to issue 20,484 shares of preferred stock at $10 each and 57,204 common at $8 each, or an aggregate of $662,472. Proceeds are to provide working capital and or retire first mortgage serial gold bonds. The company has option rights to obtain and sell all or part of 20,000 shares of common stock issued to the Electric Auto-Lite Company, Toledo. Among the officers are O. B. Mueller, president; F. L. Riggin, executive vice-president and secretary and B. F. Mueller, vice-president and treasurer, all of Port Huron, Mich.

Hershey Metal Products, Inc., Derby, Conn., capital $50,000; par $100; paid $1500; incorporators P. H., A. S. and Mary J. R. Hershey. The following departments will be operated: tool room, spinning, stamping, polishing, lacquering, japanning.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

August 1, 1934.

Waterbury factories have begun to feel the effects of the usual summer slump. The **Scovill Manufacturing Company** has reduced the hours in most departments to five hours a day, five days a week. In some departments and most offices the hours are seven hours a day. **John H. Goss,** vice president, said that the reduction is expected to be temporary and that it is due to the expected summer slump. It would be easier to lay off some of the employes but the management considered it better to spread the work as much as possible, he said.

In the **Waterbury Manufacturing Company** branch of the **Chase Companies,** a similar adjustment has been made. Most departments that have been working 40 hours a week are now cut to 35 hours or less. The reduction applies to the offices as well as to the operating departments.

The **Waterbury Clock Company** closed for one week at the 4th. The **Chase Companies, Scovill Manufacturing Company** and **American Brass Company** closed for the 4th and the two following days.

The **Chase Companies,** last week, received an order from the government for 500,000 pounds of ingot copper at 8,675 cents a pound. The **Scovill Manufacturing Company** received an order 30,000 pounds of brass rod at 12.875 cents a pound 14,000 pounds of spinning brass at 14.75 cents a pound. It is understood that the **American Brass Company** was also given orders for some post office work.

The **Waterbury Fastener Company** has been notified by Senator Augustine Lonergan that the President has approved an order excluding from importation all slide fasteners and parts which are found to infringe certain patent rights held by the local concern. It and other Connecticut manufacturers of zippers had complained of this practice. The order requires importers to furnish a bond to guarantee that the products imported would not violate patent rights and would be sold in fair competition.

The **Scovill Manufacturing Company** has been awarded first prize for its exhibit of its products at the **Inform-A-Show** held in Cleveland. The booth was designed and constructed by the local firm using materials made by the company. Two unusual modernistic lamps used to light the exhibit excited much interest.

Waterbury Clock Company has inaugurated a system of rotating employment for its 2,800 employes during the summer whereby about 600 hands are off duty each week.

The RFC officials in Washington have given assurance that a loan will be made to a company to be organized to take over the **Beardsley & Wolcott Manufacturing Company,** now in receivership. The new corporation will be created by the creditors. For that reason **Judge Frederick M. Peasley** of the superior court has granted an extension of the receivership for one month. At a previous hearing **Judge Edwin Dickenson** was reluctant to continue the receivership because during recent months it showed a loss of about $1,000 a month. The representative of the creditors, holding about $270,000 in claims, the city which has a claim of $50,000 for taxes, and the **Chamber of Commerce** urged that the receivership be continued as otherwise about 150 persons would be thrown out of work.

Patents granted local inventors during the last month included the following: **Walter R. Hibbard and Ellsworth Candee,** assignors to the **American Brass Company,** an electrolytic solution; **Paul E. Fenton,** assignor to the **Scovill Manufacturing Company,** a "self-adjusting separable fastener"; **Anson W. Miner,** assignor to the **Waterbury Brass Goods Corporation,** radio tube connector; **Elmer L. Munson,** assignor to the **American Brass Company,** copper alloy welding rod and method of using the same.

Products of the **Chase Companies, Inc.,** are included in the Exhibition of the **Industrial Art of Connecticut** at the **Lyman Allyn Museum** in New London. The products include plain brass and copper and also finished articles.

—W. R. B.

Connecticut Notes

August 1, 1934.

HARTFORD—The **Pratt & Whitney Company** has received a $17,886 order for motor driven jib boring machines for the navy. It has also received a $2,442 order for a precision tool lathe for the Picatilmy arsenal.

The **Underwood-Elliott Fisher Company** production at its local plant in June showed increase over May and its July business has been holding up well.

The **Royal Typewriter Company** reports sales in the first six months of the year as the best in history. A new model typewriter is being well received.

NEW BRITAIN—**Landers, Frary & Clark** directors, voted a dividend of 37½ cents a share payable June 30. **Hart & Cooley** directors declared a dividend of $1.12½ payable the same

date. The **Fafnir Bearing Company** has declared the regular quarterly dividend of 75 cents a share, payable July 1. The **Stanley Works** paid the regular dividend of 25 cents a share on July 2. **North & Judd Manufacturing Company** paid the regular dividend of 25 cents on June 30.

The **New Britain Gridley Machine Co.** has been given an $8,056 order by the army for spindle screw machines for the Springfield armory.

BRIDGEPORT — William Fray, founder of the **Standard Brass & Copper Tube Company,** taken over in 1918 by the **Bridgeport Brass Company** in 1918, died here July 22 at the age of 68. During his career in the brass business he invented several machines now used by many brass concerns. He is survived by two brothers, **Thomas,** of Milford, Conn., and **Samuel,** of Pittsburg, Penn., a sister, **Mrs. Walter R. Clark** of Bridgeport, a son, **George Gray,** of Bridgeport and several nieces and nephews. The funeral was held July 24th with burial in Bridgeport.

The **Remington Arms Company** has drawn $124,500 first mortgage 6 per cent sinking fund bonds, Series A., due May 1, 1937 for redemption for the account of the sinking fund. They are payable at 101½ plus interest, Aug. 13.

The **Bassick Company** announces the resignation of **Leslie McArthur** as vice president and general manager and the election of **W. A. Rose** of Chicago to succeed him.

WINSTED—About 400 are now employed at the **William L. Gilbert Clock Company** compared with 300 a year ago. Business at the **Winsted Insulated Wire Company** during May was the best since 1931 and is still holding up well.

TERRYVILLE—The **Eagle Lock Company** has received a $1,213 order for lock boxes for the post office department.

THOMASTON—Products of the **Seth Thomas Clock Company** are on display at the exhibition of the **Industrial Arts of Connecticut** at the **Lyman Allyn** museum in New London.

BRISTOL — The New Departure Manufacturing Company plant was closed for two weeks around the 4th for inventory and repairs.

SHELTON—The Metco Company, manufacturers of silver and other metal specialties, has moved here from Brooklyn, N. Y., and is about ready to start production.

SEYMOUR—The **New Haven Copper Company** of this town has been given an order for 2,025 pounds of copper at 16.83 cents a pound for delivery to the navy yard in Puget Sound. It has also received another order amounting to $739 from the navy.

STAMFORD—The **Yale & Towne Manufacturing Company** has declared a dividend of 15 cents a share, payable Oct. 1 on stock of record, Sept. 21.

COLLINSVILLE — The **Collins Company** directors paid a quarterly dividend of $1 a share on July 15. The previous rate was 50 cents. All officers and directors were reelected last month. The annual report shows a surplus of $996,454 compared with $912,626 a year ago. Total assets are given as $2,533,734.—W. R. B.

Providence, R. I.

August 1, 1934.

The second half of the year begins with a much more encouraging outlook generally among the metal trades here than in a long time. The only branch that appears diliatory is the textiles, which is a very potent factor in the machinery and tool industries of this city. Among the building trades there appears to be greater hopefulness for an active movement from now on that will furnish improved conditions in hours and wages as well as in number of employes. Bearing out early predictions of jewelry manufacturers that the 1934 fall season would be better than in several years, business for that period has already begun and in a satisfactory manner. During the early part of this month more buyers were registered at the local hotels than in a long time.

Fray Jewelry Company, Providence, has been incorporated under the laws of Rhode Island, with an authorized capital of 100 shares of common stock of no par value, to conduct a manufacturing jewelry business. The incorporators are **Samuel A. Hamin** and **James F. Armstrong** of Providence and **Nora R. McGrath** of Edgewood.

Articles of incorporation have been granted to **A & B Manufacturing Company, Inc.,** Providence, to conduct a manufacturing jewelers' findings and supplies business, with a capital stock of 100 shares of common no par value. The incorporators are: **Charles Asadorian** and **Sayles Gorham** of Providence and **Zena B. Wilcox** of Riverside.

The **Mason Manufacturing Company** of East Providence, has changed its corporate name to the **Mason Can Company.**

Harvey & Otis Company of Providence, has been incorporated to conduct a manufacturing jewelry business with a capital stock consisting of 600 shares of common of no par value. The incorporators are **William P. Otis, Fred A. Otis** of Providence and **Isaac B. Lawton** of Central Falls.

The Curran Manufacturing Company of Providence, has been granted a charter here to conduct a manufacturing jewelry business with an authorized capital consisting of 100 shares of stock of no par value. The incorporators are **Leo B. Curran** and **Harold W. James** of Providence and **Jeannette Perrino** of Cranston.

Alfred H. Angell has filed a statement that he is the owner of the **Providence Valve Company,** 108 Eddy Street.

—W. H. M.

Middle Atlantic States

Newark, New Jersey

August 1, 1934.

The **Ritz Chemical Company,** has purchased a two story factory building on Avenue C from the **Newark Noveloid Company.** Increased business necessitated larger quarters. The **Ess-Arr Manufacturing Company,** makers of toys, has leased a building on East Bigelow Street. The **Oliver Electric Corporation,** has leased additional manufacturing space from the **Hanovia Chemical & Manufacturing Company,** at 5 Oliver Street. **Barth Laboratories, Inc.,** Newark, have removed to larger quarters at 225 Main Street, Belleville. **Blasius Bart,** president of the **Bart Laboratories,** has specialized in the electroplating and electrodeposition of semi-precious and precious metals. The major field of his operations has been in the manufacture of reflectors for searchlights and other purposes.

—C. A. L.

Trenton, New Jersey

August 1, 1934.

The **Trenton City Commission** has offered to donate 30 acres of land to the **Bendix Corporation** if it will locate here. The land is valued at $100,000. The plant will cost $2,000,000 and employ about 1,200 hands.

The **Federated Metals Corporation** has let a contract for the erection of an office building adjoining its plant. Some of the Trenton metal plants have shown improvement during the past few weeks. The **Roebling Company** and the **American Steel & Wire Company** are busy on wire orders.

Watchung Laboratories, Inc., of Trenton, has been incorporated with 2,000 shares to manufacture chemicals. Frank Transue, of 28 West State Street, is the agent in charge.

The following Newark concerns have been incorporated:

Consolidated Bearing Company, manufacture bearings, 500 shares preferred and 2,000 shares common.

Klaus & Company, Inc., brass foundry, $125,000.

J. Kalus & Son, Inc., metals, $25,000.

Eatts Electric Controls, Inc., electrical equipment, 2,500 shares no par.

Bach Laboratories, Inc., chemicals, 10,000 shares no par.

Sterling Products, Inc., metal products, 1,000 shares no par.

Metal Manufacturing Company, metal goods, $2,000.

Columbia Finding Company, Inc., manufacturing jewelry, 2,000 shares no par.

Walcutt - Williams Manufacturing Company, chemicals, 500 shares no par.

—C. A. L.

Middle Western States

Detroit, Michigan

August 1, 1934.

The mid-summer quiet period has settled down over this area in its usual fashion. Manufacturing plants of all kinds have either decidedly reduced production or have closed for a few weeks.

While this may seem rather ominous it is nothing to cause much concern. Even in the best of years the same sort of conditions have prevailed during July and much of August.

While there is uncertainty as to the future, nearly every one is optimistic and some even go so far as to say that the coming fall has much greater things in store.

One of the few active industrial lines at present is refrigeration. These plants continue about as promising as during the late winter and spring. This is one field where adverse business conditions do not seem to be felt to any considerable extent.

Motor car production is gradually dropping back. Some of the larger plants are doing hardly anything at all. But this is as it has been in other years at this time.

Accessory manufacturers, in line with others, also are easing off on production. Most of them, however, have had a long run of activity and are looking forward to better things when the industrial campaign opens again in the fall.

Manufacturers of builders' and plumbers' supplies have not had an encouraging season. Nor have they much to look forward to from the approaching fall.

Manufacturing jewelers are doing almost nothing. This is a line that did not seem to awaken when the drive for better things was started early last winter.

Dr. Francis Lamb, well-known physicist of the **Michigan State College,** has been appointed as spectro-analyst at the **Michigan Smelting and Refining Company's** plant of the **Bohn Aluminum & Brass Corporation.** His work largely will be in connection with research on bearing materials. It is stated that interesting announcements concerning new bearing materials soon will be made by the Bohn organization. It is said the new materials are particularly adapted for the increased loads and speeds now required of modern automobile engines.

In a recent report to his board of directors, **Willard H. Dow,** president of the **Dow Chemical Company,** at Midland, Mich., said that employment was up 50 per cent over a year ago, and that sales had shown a like increase. Every department, he added, was operating. **E. W. Bennett,** auditor, has been made treasurer. Membership of the board remains unchanged.

—F. J. H.

Chicago, Illinois

August 1, 1934.

A decided improvement is seen in the non-ferrous metals here, with most of the firms employing anywhere from 25 to 50 per cent more help than a year ago and working 100 per cent capacity. A number report that businsess has increased 100 per cent. Labor troubles outside the metal trade have rocked the market some the past couple of months, but this is gradually being overcome.

This improved condition is noted in visits to foundries. The **Ace Foundry** is one which reports business 100 per cent better than a year ago. This increase, according to G. V. W. Roth, secretary, is most marked in material sold to railroads such as rolling stock and metal for passenger car work. The roads have been doing extensive repair work this season. Production at this foundry is on full time, five-day schedule, with 40-hour week.

Orders, which were exceptionally good in May and June, are falling off somewhat now, although the future outlook is bright, reports the **Hodgson Foundry,** one of the largest bronze foundries in the middle west. This is operating 50 per cent capacity and employing 30 per cent more force than a year ago.

Christiansen & Olsen Foundry Company finds business at least 50 per cent better than a year ago, with prospects for continued improvement.

Carl Anderson, president of the **Anderson Foundry,** states that business is much better than for the comparative periods last year, although unsettled labor conditions have made this improvement less marked than he anticipated. Large demand for vending machines this season has helped to boost orders, and there has been a great demand also for automobile castings. The past 30 days has shown a slight decrease in business, however. The plant is operated on a five-day week, with 25 per cent more persons employed this year than last.

The **Hegeler Zinc Company** of Danville, with branch offices in Chicago, reports that it would have experienced an outstandingly good season had it not been for the labor strike which tied up their production in the late spring. This has now been satisfactorily settled with no sign of any future trouble, and with every indication of increasing business.

Troy Brass & Aluminum Foundry is operating 90 per cent. The outlook is good, and 50 per cent better than last year at this time.

Frank Hayes of the **Chicago Hardware Foundry is** the code representative for this division.

Probably the largest massed vacation of any industry took place between July 13 and July 27, when the **Western Electric Company's Hawthorne Plant** closed for its annual two weeks vacation. A skeleton manufacturing force was retained to care for possible emergencies in communication.

—R. G. K.

Pacific States

Los Angeles, Cal.

August 1, 1934.

David Friedman of 1149 South Rimpau Boulevard, will manufacture a new fog light, which will project amber beams of light 65 to 125 feet ahead, operated by ordinary battery. This is for air, auto, boats, street cars, etc., when there is fog, snow storm, dust clouds, etc.

The Northrup Corporation at El Segundo have started building a steel addition to their airplane factory, to add 36,000 square feet to the plant.

The Goodwill Industries, 7342 North Main St. have put in a silver repair plant in charge of **John Walker** and jewelry in charge of **Fred C. Adams.**

The Kinner Airplane & Motor Corporation of Glendale, have developed a high powered air craft engine, which will be built specially for the U. S. Army and Navy.

A new concern here is the **Adjustable Reversible Pitch Propeller Corporation** which has been organized by **W. D. Longyear, Carl McStay, Seth Hart** and **Paul Mantz** at the Union Air Terminal, Burbank. By this propeller the airplane can be stopped quickly in mid air or go in reverse on the ground.

The **Harold Meyer Fishing Tackle Company** of Brooklyn, N. Y., have opened a branch factory here at 722 Towne, have put in machinery to make swelled hooks, leaders, swivels, rod mountings and a large line of metal fishing tackle.

The **Kaelin Electric Company,** of 1410 South Los Angeles St., are making a specialty of electric light plants.

The **Kim Manufacturing Company** here, have started making a "moon flower light," to illuminate the garden, patio or outdoors.

The **Dodge Brothers Corporation** have announced that all trucks to be sold to the Pacific area, will be made at the **Maywood** plant of the **Chrysler Motor Company.** They will turn out fifty trucks a day. **C. H. Fennell** is general manager and **P. W. Gaebelein,** plant manager.

The **Atlas Brass Foundry** of 1901 Santa Fe Ave., have gone heavily into bronze bushings.

The **S. & M. Lamp Company** are making new flood lights.

The **General Fireproofing Company** of Youngstown, Ohio, had an exhibit here of steel filing cabinets

The **Mead Sales Equipment Manufacturing Company** of 407 East Pico St., are making all metal products.

The **Yawman & Erbe Manufacturing Company** of 731 South Spring St. have been showing new ideas in filing cabinets.

The **Ediphone Company** are pushing dictaphones.

The **Axelson Company** had an exhibit of all engine parts.

The **United States Electric Manufacturing Company** of 200 East Slauson Ave., are making motor armatures.

—H. S.

Metal Market Review

August 1, 1934.

The month was dull with most prices changing only fractionally and business slowing down seasonally. Considerable work is being done by the Copper Code Authority in lining up consumers of raw material to purchase their requirements of Blue Eagle copper. Details are given in the Wrought Metal Market Review on this page and also page 288 of this issue.

Copper was substantially unchanged throughout at 9.125 for Lake, 9.00 for electrolytic and 8.125 for casting.

Zinc opened the month at 4.35 (Prime Western) but slipped about the middle of the month to 4.325 and then to 4.30, closing at this figure. World stocks of zinc at the end of June were smaller than at the close of the preceding month, due largely to reduction in output.

Tin opened at 51.25 and fluctuated very narrowly throughout, going as high as 52.375 and closing at 52.10. A communication from the International Tin Research and Development Council reports a 27 per cent increase in world tin consumption for the year ending in May. American consumption rose from about 32,500 long tons to something over 58,000 long tons.

Lead began the month at 3.60, went up to 3.65 and then 3.70 about the latter third of the month and closed again at 3.65.

Aluminum was unchanged throughout at 23.30.

Nickel was unchanged throughout at 35.

Antimony began at 7.80, crawled upward slowly to 8.25, and closed at 8.125.

Silver, another usually active performer, was also subdued. It began at 46.50, went no higher than 46.75, no lower than 45.125, and closed at 46.125.

Platinum remained fixed at 34.00. **Gold** also remained static at 35.

Scrap metals changed little or not at all, following as they always do, the action of the new metal market.

Ingot Metal Statistics

The Code Authority of the Ingot Brass and Bronze Industry reports that from reports made by Thirty-eight companies engaged in that industry, the combined shipments and deliveries of Ingot Brass and Bronze made during the calendar month of June, 1934, amounted to 4,941 net tons.

Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on Commercial Grades of six principal mixtures of Ingot Brass during the twenty-eight day period ending July 13.

The statistics will have to be gathered and reported on the basis of "Comercial Grades" until the revised Tentative Specifications for Copper Base Alloys in Ingot Form for Sand Castings, adopted as Tentative Specifications by the American Society for Testing Materials, are in sufficiently general use to enable the gathering of statistics on a strict specification basis.

Commercial 80-10-10 (1½% Impurities)	10.263c
Commercial 78% Metal	8.000c
Commercial 81% Metal	8.251c
Commercial 83% Metal	8.509c
Commercial 85-5-5-5	8.764c
Commercial No. 1 Yellow Brass Ingot	7.037c

The Wrought Metal Market

August 1, 1934.

Prices were largely unchanged during the month as the Blue Eagle prices for raw copper and other metals remained the same. The mills are slowing down due to seasonal factors. In general, the month was dull.

Exports of copper products are said to have been declining because of the spread in price between Blue Eagle copper and copper abroad. There is a serious question as to the effect of the "pegging" of copper prices under the Blue Eagle upon the sales of fabricated metals and metal products. It is noteworthy that the National Lead Company, the leading manufacturer of lead and lead products, is on record against price-fixing codes.

The Copper Code Authority has asked the signers of temporary purchasing agreements (see page 288 of this issue) to sign permanent agreements, which will remain in effect for a period of four months after approval, these agreements providing for the purchase of certain percentages of new sales commitments, of Blue Eagle copper by fabricators and metal products manufacturers. These signers also agree that they will neither purchase nor fabricate on toll any copper other than Blue Eagle. However, amendments have been made so that copper fabricators may purchase metal at the foreign price for exclusive use in products sold abroad.

Canadian manufacture of non-ferrous metals increased from about $142,000,000 to $167,000,000 between 1932 and 1933.

Daily Metal Prices for July, 1934

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	2	3	4*	5	6	9	10	11	12	13	16	17	18
Copper c/lb. Duty 4 c/lb.													
Lake‡ (del. Conn. Producers' Prices)	9.125	9.125	...	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125
Electrolytic‡ (del. Conn. Producers' Prices)	9.00	9.00	...	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Casting (f.o.b. ref.)	8.125	8.125	...	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.													
Prime Western (for brass special add 0.05)	4.35	4.35	...	4.35	4.35	4.35	4.35	4.35	4.325	4.325	4.30	4.30	4.30
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	51.25	51.30	...	52.00	51.95	51.80	51.85	51.85	51.85	51.875	51.90	51.95	51.90
Lead (f.o.b St. L.) c/lb. Duty 2½ c/lb.	3.60	3.60	...	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Aluminum c/lb. Duty 4 c/lb.	23.30	23.30	...	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3 c/lb.													
Electrolytic 99.9%	35	35	...	35	35	35	35	35	35	35	35	35	35
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	7.80	7.80	...	7.80	7.75	7.75	7.75	8.00	8.00	8.125	8.25	8.25	8.25
Silver c/oz. Troy, Duty Free	46.50	46.625	...	46.75	46.50	46.50	45.125	46.50	46.625	46.375	46.375	46.375	46.625
Platinum $/oz. Troy, Duty Free	34.00	34.00	...	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Gold—Official Price† $/oz. Troy	35.00	35.00	...	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00

	19	20	23	24	25	26	27	30	31	High	Low	Aver.
Copper c/lb. Duty 4 c/lb.												
Lake‡ (del. Conn. Producers' Prices)	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125
Electrolytic‡ (del. Conn. Producers' Prices)	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Casting (f.o.b. ref.)	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125	8.125
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.												
Prime Western (for brass special add 0.05)	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.35	4.30	4.318
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	51.95	51.95	51.95	52.15	52.375	52.125	52.10	52.10	52.10	52.375	51.25	51.918
Lead (f.o.b St. L.) c/lb. Duty 2½ c/lb.	3.60	3.65	3.70	3.70	3.70	3.70	3.70	3.65	3.65	3.70	3.60	3.629
Aluminum c/lb. Duty 4 c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3 c/lb.												
Electrolytic 99.9%	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	8.25	8.25	8.25	8.125	8.125	8.125	8.125	8.125	8.125	8.25	7.75	8.015
Silver c/oz. Troy, Duty Free	46.50	46.50	46.00	46.00	46.125	46.00	45.75	45.75	46.125	46.75	45.75	46.310
Platinum $/oz. Troy, Duty Free	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Gold—Official Price† $/oz. Troy	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00

* Holiday.

Metal Prices, August 1, 1934

(Import duties and taxes under U. S. Tariff Act of 1930, and Revenue Act of 1932)

NEW METALS

Copper: Lake, 9.125, Electrolytic, 9.00, Casting, 8.125.
Zinc: Prime Western, 4.30. Brass Special, 4.40.
Tin: Straits, 51.70. Pig, 99%, 51.00.
Lead: 3.65. **Aluminum,** 23.30. **Antimony,** 8.125.
Nickel: Shot, 36. Elec., 35.

Quicksilver: Flasks, 75 lbs., $75.50. **Bismuth,** $1.20.
Cadmium, 55. **Silver,** Troy oz., official price, N. Y., Aug. 3, 46¾. **Gold:** oz., Troy, Official U. S. Treasury price Aug. 3, $35.00. **Scrap Gold,** 6½c. per pennyweight per karat, dealers' quotation, Aug. 3. **Platinum,** oz. Troy, $34.00.

Duties: Copper, 4c. lb.; zinc, 1¼c. lb.; tin, free, lead, 2½c. lb.; aluminum, 4c. lb.; antimony, 2c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	U. S. Duty	Import Tax*
Brass Ingots, Yellow	7 to 8	None	4c. lb.[1]
Brass Ingots, Red	8¼to11	do	do
Bronze Ingots	9¼to12½	do	do
Aluminum Casting Alloys	15½to22	4c. lb.	None
Manganese Bronze Castings	20 to34	45% a. v.	3c. lb.[2]
Manganese Bronze Forgings	26 to38	do	do
Manganese Bronze Ingots	8¾to13	do	4c. lb.[1]
Manganese Copper, 30%	11½to16	25% a. v.	3c. lb.[2]
Monel Metal Shot or Block	28	do	None
Phosphor Bronze Ingots	10 to12	None	4c. lb.[1]
Phosphor Copper, guaranteed 15%	13¼to15	3c. lb.[2]	do
Phosphor Copper, guaranteed 10%	11½to14	do	do
Phosphor Tin, no guarantee	61to75	None	None
Silicon Copper, 10%	18 to30	45% a. v.	4c. lb.[1]
Iridium Platinum, 5%	$37-38.50	None	None
Iridium Platinum, 10%	38-39.50	None	None

*Duty is under U. S. Tariff Act of 1930; tax under Section 60 (7) of Revenue Act of 1932.
[1]On copper content. [2]On total weight. "a. v." means ad valorem.

OLD METALS

Dealers' buying prices, wholesale quantities:	Cents lb.	Duty	U. S. Import Tax
Heavy copper and wire, mixed	6⅜to 6⅝	Free	4c. per pound on copper content.
Light copper	5½to 5¾	Free	
Heavy yellow brass	3⅜to 3⅝	Free	
Light brass	3 to 3⅛	Free	
No. 1 composition	4⅞to 5⅛	Free	
Composition turnings	4⅝to 4⅞	Free	
Heavy soft lead	3 to 3¼	2⅛c.lb.	
Old zinc	2¼to 2⅜	1½c.lb.	
New zinc clips	2¾to 3	1½c.lb.	
Aluminum clips (new, soft)	12¼to13¼	4c.lb.	
Scrap aluminum, cast	9¼to10	4c.lb.	
Aluminum borings—turnings	5 to5½	4c.lb.	None.
No. 1 pewter	30 to32	Free	
Electrotype or stereotype	2⅞to3	2⅛c. lb.*	
Nickel anodes	30 to33	10%	
Nickel clips, new	31 to33	10%	
Monel scrap	11 to18½	10%a.v.	

*On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, quantity, packing, etc., or discounts, as shown in manufacturers' price lists, effective since June 12, 1934. Basic quantities on most rolled or drawn brass and bronze items below are from 2,000 to 5,000 pounds; on nickel silver, from 1,000 to 2,000 pounds.

COPPER MATERIAL

	Net base per lb.	Duty*
Sheet, hot rolled	16c.	2½c. lb.
Bare wire, soft, less than carloads	12.75c.	25% a. v.
Seamless tubing	17.25c.	7c. lb.

*Each of the above subject to import tax of 4c. lb. in addition to duty, under Revenue Act of 1932.

NICKEL SILVER

Net base prices per lb. (Duty 30% ad valorem.)

Sheet Metal		Wire and Rod	
10% Quality	23.75c.	10% Quality	26.625c.
15% Quality	25.875c.	15% Quality	31.00c.
18% Quality	27.125c.	18% Quality	34.25c.

BRASS AND BRONZE MATERIAL

	Yellow Brass	Red 80%	Comm'l. Bronze	Duty	
Sheet	14½c.	15⅜c.	16	4c. lb.	U. S. Import Tax
Wire	15 c.	15⅞c.	16½	25%	4c. lb. on copper content
Rod	13 c.	15⅞c.	16⅜	4c. lb.	
Angles, channels	22½c.	23⅝c.	24	12c. lb.	
Seamless tubing	17 c.	17¾c.	18⅝	8c. lb.	
Open seam tubing	22½c.	23⅝c.	24	20% a. v.	No tax.

TOBIN BRONZE AND MUNTZ METAL

Net base prices per pound. (Duty 4c. lb.; import tax 4c. lb. on copper content.)	
Tobin Bronze Rod	16½c.
Muntz or Yellow Rectangular and other sheathing	17⅝c.
Muntz or Yellow Metal Rod	14 c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb. 32.80
Aluminum coils, 24 ga., base price, tons lots, per lb.....30.50

ROLLED NICKEL SHEET AND ROD

Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (Aug. 3) 48.75c. per Troy oz. upward according to quantity. (Duty, 65% ad valorem.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.50	2c. lb.
Zinc sheet, 1200 lb. lots (jobbers' price)	10.25	2c. lb.
Zinc sheet, 100 lb. lots (jobbers' price)	14.25	2c. lb.
Full Lead Sheet (base price)	7.25	2⅜c. lb.
Cut Lead Sheet (base price)	7.50	2⅜c. lb.

BLOCK TIN, PEWTER AND BRITANNIA SHEET

(Duty Free)

This list applies to either block tin or No. 1 Brittannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs. or over .....15c. above N. Y. pig tin price
100 to 500 lbs. .....17c. above N. Y. pig tin price
Up to 100 lbs. .....25c. above N. Y. pig tin price
Up to 100 lbs. .....25c. above N. Y. pig tin price

Supply Prices on page 296.

Supply Prices, August 1, 1934

ANODES

Prices, except silver, are per lb. f.o.b., shipping point, based on purchases of 500 lbs. or more, and subject to changes due to fluctuating metal markets.

Copper: Cast ..... 16½c. per lb.
Electrolytic, full size, 13½c.; cut to size 14c. per lb.
Rolled oval, straight, 13¾c.; curved, 15¼c. per lb.
Brass: Cast ..... 15c. per lb.
Zinc: Cast ..... 9c. per lb.
Nickel: 90-92% ..... 44c. per lb.
95-97% ..... 45c. per lb.
99%+cast, 47c.; rolled, depolarized, 48c.
Silver: Rolled silver anodes .999 fine were quoted Aug 3. from 51.75c. per Troy ounce upward, depending upon quantity.

WHITE SPANISH FELT POLISHING WHEELS

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	$2.95/lb.	$2.65/lb.	$2.45/lb.
10-12-14 & 16	2 to 3½	2.85	2.55	2.35
6-8 & over 16	1 to 2	3.05	2.75	2.55
6-8 & over 16	2 to 3½	3.00	2.70	2.45
6 to 24	Under ½	4.25	3.95	3.75
6 to 24	½ to 1	3.95	3.65	3.45
6 to 24	Over 3½	3.35	3.05	2.85
		Any Quantity		
4 to 6	Under ½, $5.00	½-1, $4.85	1 to 3, $4.75	
1½ to 4	" 5.55	" 5.40	" 5.35	
1 to ½	" 5.85	" 5.70	" 5.60	

Extras: 25c per lb. on wheels, 1 to 6 in. diam., over 3 in. thick.
On grey Mexican wheels deduct 10c. per lb. from above prices.

COTTON BUFFS

Full disc open buffs, per 100 sections when purchased in lots of 100 or less were quoted July 2:

16" 20 ply 84/92 Unbleached	82.11
14" 20 ply 84/92 Unbleached	62.92
12" 20 ply 84/92 Unbleached	47.27
16" 20 ply 80/92 Unbleached	67.64
14" 20 ply 80/92 Unbleached	51.91
12" 20 ply 80/92 Unbleached	39.09
16" 20 ply 64/68 Unbleached	60.41
14" 20 ply 64/68 Unbleached	46.41
12" 20 ply 64/68 Unbleached	35.00

⅜" Sewed Pieced Buffs, per lb., bleached or unbleached 40c. to 1.09

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone C. P.	lb.	.11½-.12½
Acid—Boric (Boracic) granular, 99½+% ton lots	lb.	.04½-.05
Chromic, 75 to 400 lb. drums		.15-.15¼
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.03
Hydrochloric, C. P., 20 deg., carboys	lb.	.06½
Hydrofluoric, 30%, bbls.	lb.	.07-.08
Nitric, 36 deg., carboys	lb.	.05-.06¼
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl, drums	lb.	.09½-.11
Denatured, drums	gal.	.475-.476
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.05
Ammonia, aqua, com'l., 26 deg., drums, carboys	lb.	.02½-.05
Ammonium—Sulphate, tech., bbls.	lb.	.03½-.05
Sulphocyanide, technical crystals, kegs	lb.	.50-.58
Arsenic, white kegs	lb.	.04½-.05
Asphaltum, powder, kegs	lb.	.23-.41
Benzol, pure, drums	gal.	.41
Borax, granular, 99½+%, ton lots	lb.	.02¼-.02¾
Cadmium oxide, 50 to 1,000 lbs.	lb.	.55
Calcium Carbonate (Precipitated Chalk), U. S. P.	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.05½-.06
Chrome, Green, commercial, bbls.	lb.	.21½
Chromic Sulphate, drums	lb.	.33-.55
Copper—Acetate (Verdigris)	lb.	.21
Carbonate, 53/55% cu., bbls.	lb.	.15-.16½
Cyanide (100 lb. kgs.)	lb.	.38-.40
Sulphate, tech., crystals, bbls.	lb.	4.55-5c.
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus Martis (Iron Oxide) red, tech., kegs.,	lb.	.07
Dextrin, yellow, kegs	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	30.00
Fluorspar, bags	lb.	.03½
*Gold Chloride	oz.	$18¼-23
Gum—Sandarac, prime, bags	lb.	.50
Shellac, various grades and quantities	lb.	.21-.31
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lead—Acetate (Sugar of Lead), bbls.	lb.	.10-.13½
Oxide (Litharge), bbls	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, (Wood Alcohol) 100% synth., drums	gal.	.42½
Nickel—Carbonate, dry, bbls.	lb.	.35-.41
Chloride, bbls.	lb.	.18-.22
Salts, single, 300 and 425 lb. bbls.	lb.	.12-.13
Salts, double, 425 lb. bbls.	lb.	.12-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.08-.093
Potassium—Bichromate, casks (crystals)	lb.	.08⅛
Carbonate, 96-98%	lb.	.08¼
Cyanide, 165 lbs. cases, 94-96%	lb.	.57½
Gold Cyanide	oz.	$15.45*
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge—Nickel, 100 lb. lots	lb.	.08
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05-.07½
*Silver—Chloride, dry, 100 oz. lots	oz.	.39¼
Cyanide, 100 oz. lots	oz.	.49
Nitrate, 100 ounce lots	oz.	.33¾
Soda Ash, 58%, bbls.	lb.	.0252
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Beryllium fluoride ($2NaF.BeF_2$)	lb.	4.30-7.00
Gold Cyanide	oz.	$17.10*
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate, granular, bbls.	lb.	3.55-3.70
Nitrate, tech., bbls.	lb.	.02¼
Phosphate, tribasic, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate, drums	lb.	.35-.40
Sulphocyanide, drums	lb.	.30-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.39
Tripoli, powdered	lb.	.03
Trisodium Phosphate—see Sodium Phosphate.		
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc—Carbonate, bbls.	lb.	.11-.12
Cyanide (100 lb. kegs)	lb.	.07½-.10
Chloride, drums, bbls.	lb.	.38
Sulphate, bbls.	lb.	.033-.037

* Gold and silver products subject to fluctuations in metal prices.